EXECUTIVE OFFICE OF THE PRESIDENT
COUNCIL OF ECONOMIC ADVISERS

THE ECONOMIC IMPACT OF THE AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009

FIRST QUARTERLY REPORT

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EXECUTIVE SUMMARY

As part of the unprecedented accountability and transparency provisions included in the American Recovery and Reinvestment Act of 2009 (ARRA), the Council of Economic Advisers was charged with providing to Congress quarterly reports on the effects of the Recovery Act on overall economic activity, and on employment in particular. In this first report, we provide an assessment of the effects of the Act in its first six months.

Evaluating the impact of countercyclical macroeconomic policy is inherently difficult because we do not observe what would have happened to the economy in the absence of policy. And the sooner the evaluation is done after passage, the less data one has about key economic indicators. Any estimates of the impact of the ARRA at this early stage must therefore be regarded as preliminary and understood to be subject to considerable uncertainty. In this regard, it is important to note that there has not yet been any direct reporting by recipients of ARRA funds on job retention and creation. Such direct reporting data will be evaluated and incorporated in future reports.

Because of the inherent difficulties in the analysis, we approach the task of estimating the impact of the Recovery Act from a number of different directions. Our multi-faceted analysis suggests that the ARRA has had a substantial positive impact on the growth of real gross domestic product (GDP) and on employment in the second and third quarters of 2009. That various approaches yield similar estimates increases the confidence one can have in the results.

Among the key finding of the study are:

- As of the end of August, $151.4 billion of the original $787 billion has been outlaid or has gone to American taxpayers and businesses in the form of tax reductions. An additional $128.2 billion has been obligated, which means that the money is available to recipients once they make expenditures. The areas where stimulus has been largest in the first six months are individual tax cuts, state fiscal relief, and aid to those most directly hurt by the recession. That recovery funds have gone out rapidly certainly increases the probability that the Act has been effective in its first six months.

- Following implementation of the ARRA, the trajectory of the economy changed materially toward moderating output decline and job loss. The decomposition of the GDP and employment change by components or sector suggests that the ARRA has played a key role in this change of trajectory.

- Estimates of the impact of the ARRA made by comparing actual economic performance to the predictions of a plausible, statistical baseline suggest that the Recovery Act added roughly 2.3 percentage points to real GDP growth in the second quarter and is likely to add even more to growth in the third quarter.

- This analysis indicates that the ARRA and other policy actions caused employment in August to be slightly more than 1 million jobs higher than it otherwise would have been. We estimate that the Act has had particularly strong effects in manufacturing, construction, retail trade, and temporary employment services. The employment effects are distributed across states, with larger effects in states more severely impacted by the recession.

- In addition to the estimates based on statistical projection, we provide estimates of the effects of the ARRA from standard economic models. Both our multiplier analysis and estimates from a wide range of private and public sector forecasters confirm the estimates from the statistical projection analysis. There is broad agreement that the ARRA has added between 2 and 3 percentage points to baseline real GDP growth in the second quarter of 2009 and around 3 percentage points in the third quarter. There is also broad agreement that it has likely added between 600,000 and 1.1 million to employment (again, relative to what would have happened without stimulus) as of the third quarter.

- Fiscal stimulus appears to be effective in mitigating the worldwide recession. Nearly every industrialized country and many emerging economies responded to the severe financial crisis and recession by enacting fiscal stimulus. However, countries differed greatly in the size of their fiscal actions. We find that countries that adopted larger fiscal stimulus packages have outperformed expectations relative to those adopting smaller packages.

- State fiscal relief was one of the ways in which the Recovery Act was able to provide support for the economy most quickly, and it played a critical role in helping states facing large budget shortfalls because of the recession. Our analysis indicates that state fiscal relief increased employment at the state level relative to what would have happened without stimulus. Thus, this analysis both provides evidence of how one particular type of fiscal stimulus impacts the economy and corroborates the more fundamental finding that fiscal stimulus in general is an effective countercyclical tool.

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I. INTRODUCTION

The American economy slipped into recession in December 2007. What began as a relatively moderate downturn changed dramatically following the severe disruptions in U.S. and world financial markets in the fall of 2008. By November, employment was declining at a rate of more than half a million jobs per month, and credit markets were stretched almost to the breaking point. As the economy entered 2009, the decline accelerated further, with job loss in January reaching almost three-quarters of a million. There were genuine fears that the United States and world economy were on the verge of a depression.

Less than a month after his inauguration, President Obama signed into law the American Recovery and Reinvestment Act of 2009 (ARRA). This act, together with a number of emergency measures taken by the Treasury and the Federal Reserve to stabilize financial markets, was designed to rescue an economy in freefall and provide a lift to aggregate demand at a time when the economy needed it desperately. The Recovery Act provided $787 billion of fiscal stimulus, concentrated in 2009 and 2010. At roughly 5½ percent of GDP (2 percent in 2009, 2½ percent in 2010, and about 1 percent in 2011 and beyond), the action was the boldest countercyclical fiscal action in American history.[1]

As part of the unprecedented accountability and transparency provisions included in the Act, the Council of Economic Advisers (CEA) was charged with providing to Congress quarterly reports on the effects of the Recovery Act on overall economic activity, and on employment in particular. In this first report, we provide an assessment of the effects of the Act in its first six months of operation.

It is well understood among experts that policy evaluation is difficult. Estimating the impact of countercyclical macroeconomic policy is particularly difficult because we do not observe what would have happened to the economy in the absence of policy. As the prominent economic forecaster Mark Zandi has put it, "It is important to note that estimating the economic impacts of the fiscal stimulus is not an accounting exercise …. It is not feasible to identify and count each job that results from the stimulus."[2] Furthermore, the sooner the evaluation is done after passage, the less data one has about key economic indicators. For these reasons, any estimates of the impact of the ARRA at this early stage must be regarded as preliminary and understood to be subject to substantial uncertainty.

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[1] The $787 billion figure is from Congressional Budget Office (2009a). Adding their estimate of the stimulus in fiscal year 2009 and one-quarter of the estimate for fiscal 2010 yields $285 billion in calendar year 2009, or about 2 percent of GDP. A similar procedure yields $333 billion in 2010, or about 2½ percent of GDP, and $169 billion in 2011 and beyond, or about 1 percent of annual GDP.

[2] Zandi (2009).

Because of the inherent difficulties in the analysis, we approach the task of estimating the impact of the Recovery Act from a number of different directions. We use evidence from the overall path of the economy, economic models, and cross-country and cross-state comparisons. The goal is to provide a wide range of cross-checks and alternative estimates. That various approaches yield similar estimates increases the confidence one can have in the results.

Our multi-faceted analysis suggests that the ARRA has had a substantial positive impact on real GDP growth and on employment in the second and third quarters of 2009. The ARRA is estimated both by the CEA and a wide range of private analysts to have added 2 to 3 percentage points to real GDP growth (at an annual rate) in the second quarter of 2009, and potentially an even larger amount to growth in the third quarter. Consistent with this, a range of estimation procedures indicates that employment in the second quarter was 300,000 to 500,000 greater than it otherwise would have been because of the Recovery Act. By August, two-thirds of the way through the third quarter, employment is estimated to be between 600,000 and 1.1 million higher than it otherwise would have been.

Of course, current economic indicators show that the U.S. economy is still in recession: real GDP fell at a 1 percent annual rate in the second quarter and the most recent employment report showed that employment declined by 216,000 in August. CEA and others' estimates of the effect of the Recovery Act imply that these declines in output and employment would have been significantly worse in the absence of fiscal stimulus.

As discussed above, the report marshals a wide range of evidence to support these conclusions. We begin with a summary of the spending and tax reductions that have occurred under the ARRA over its first six months. We find that as of the end of August, $151.4 billion of the original $787 billion has been outlaid or has gone to American taxpayers and businesses in the form of tax reductions. An additional $128.2 billion has been obligated, which means that the money is available to recipients once they make expenditures. That recovery funds have gone out rapidly certainly increases the probability that the Act has been effective in its first six months.

We then examine the behavior of GDP and employment in detail. We find that the trajectory of the economy has changed: job loss and output declines have moderated substantially. We also find that the decomposition of GDP and employment by components or sector suggest that the ARRA has played a key role in the change of trajectory. We supplement this analysis with an examination of the behavior of GDP and employment relative to a plausible, statistically-determined baseline. We find that actual and expected behavior is substantially better in the second two quarters of 2009 than would have been predicted based on the past behavior of the two series. This analysis provides strong suggestive evidence that the range of policy actions taken early in the year, including the ARRA, has had a substantial impact on

economic conditions.

In the course of this analysis, we use a variety of straightforward statistical procedures to allocate the estimates of job creation and retention to particular sectors and states. This analysis provides a first pass at the important issue of the industrial and geographic impact of the Recovery Act. We estimate that the Act has had particularly strong effects in manufacturing, construction, retail trade, and temporary employment services. The employment effects are distributed across states, with larger effects in states more severely impacted by the recession.

Third, we consider estimates of the impact of the ARRA from standard economic models. We incorporate the data on actual outlays and tax changes under the Act in the second and third quarters of 2009 into the multiplier analysis used by the CEA to predict the impact on GDP and employment. We compare our results with those of prominent private sector and public sector analysts. This analysis indicates that much of the change in macroeconomic behavior in the last six months is attributable to the ARRA.

Fourth, we examine the U.S. experience in international perspective. Nearly every industrialized country and many emerging economies responded to the severe financial crisis and recession by enacting fiscal stimulus. However, countries differed greatly in the size of their fiscal actions. The United States, with a program of roughly 2 percent of GDP in 2009, was above average; China at 2.6 percent and Korea at 3.0 percent were substantially larger; France at 0.6 percent and Italy at 0.1 percent were noticeably smaller. We analyze how the size of the stimulus in a country is correlated with the developments in mid-2009, relative to what was forecast back in November. We find that countries that adopted larger fiscal stimulus packages have outperformed expectations relative to those adopting smaller packages. Thus, the cross-section analysis provides further evidence that fiscal stimulus is leading to improved economic performance both in the United States and abroad.

Fifth, and finally, we look in detail at the impact of one part of the ARRA: state fiscal relief. Because this was an area where funds could be disbursed quickly, fiscal support for the states constituted one-quarter of ARRA spendout through the end of August. CEA analysis indicates that this relief successfully increased employment at the state level relative to the no-stimulus baseline, and that it did so by affecting state budgetary decisions. In this way, our analysis of state fiscal relief both provides evidence of how this particular type of fiscal stimulus impacts the economy, and corroborates the more fundamental finding that fiscal stimulus in general is an effective countercyclical tool.

This report is the first of a series that the Council of Economic Advisers will be preparing on the American Recovery and Reinvestment Act of 2009. Beginning in October, recipients of ARRA funds will begin providing direct reports of job retention and creation. Our next quarterly

report will include an evaluation of this direct reporting employment data and consider techniques for incorporating these data into our estimation.[3] Each report will, like this first one, provide rigorous analysis of the impact of the path-breaking Recovery Act of 2009.

II. THE PROGRESS OF SPENDING AND TAX REDUCTIONS UNDER THE ACT

The first step in evaluating the effects of the ARRA is to analyze the data on spending and tax reductions that have occurred under the Act. It is certainly possible that the Act could have effects even if no spending or tax changes had actually occurred. For example, its passage could have affected confidence, and expectations of a tax cut in the future could affect spending today. But, it is far more likely that the Act has had significant impact if funds have actually been spent and tax cuts have actually reached consumers.

The data on both spending and tax relief are available on the Recovery.gov website. The outlays and obligations by agency are available weekly and the tax reduction data are available monthly.[4] Outlays represent payments made by the government. Those funds represent spending that has already occurred. Obligations represent funds that have been made available but not necessarily outlaid, such as for a highway project where the builder must complete the work properly to get the final payment. One can certainly make the case the obligations can generate economic activity because recipients may begin spending as soon as they are certain funds are available.

Table 1 shows outlays, obligations, and tax reductions as of the ends of March, June, and August. Not surprisingly, as of the end of March, just six weeks after the Act was passed, only $11.8 billion of outlays and tax reductions had occurred, though an additional $21.9 billion of spending had already been obligated. By the end of June, the sum of outlays and tax reductions was $99.8 billion, with an additional $101.5 billion of spending obligated. As of the end of August, the sum of outlays and tax reductions was $151.4 billion, with another $128.2 billion obligated.

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[3] Importantly, recipient reports will not encompass all ARRA spending. Specifically, the reports due to begin in October will provide employment impacts only for those projects and activities funded by state fiscal relief grants and government investment spending. The job impacts associated with the remaining recovery funds, such as funds going to individual tax cuts, business tax incentives, and aid to directly impacted individuals, will not be captured. Furthermore, recipients are only required to report on direct jobs created or retained by the entities receiving recovery funds (for example, the general contractor for a road project) and not additional job impacts that may be occurring beyond that (for example, at sub-contractors or suppliers to the general contractor). And of course, they will not capture jobs created by the additional spending resulting from the higher incomes of the workers hired. Thus, the recipient reports will not provide an easy way of finding the overall effects of the Act.

[4] The outlays and obligations data are based on weekly reports by the relevant agencies. The tax reduction estimates are based on the Department of the Treasury Office of Tax Analysis (OTA) tax simulation model for the effect of the ARRA tax provisions. The OTA will not have comprehensive data on the 2009 tax filings until June 2010.

Table 1. Outlays, Obligations, and Tax Reductions

	Through the end of		
	March[a]	June[b]	August[c]
	Billions of Dollars		
Outlays	8.6	56.3	88.8
Obligations	30.5	157.8	217.0
Tax Reductions	3.2	43.5	62.6
Sum of Outlays and Tax Reductions	11.8	99.8	151.4

Sources: Recovery.gov; Updated simulations from the Department of the Treasury (Office of Tax Analysis) based on the Mid-Session Review.

Notes: a. Data on outlays and obligations are for March 27.
b. Data on outlays and obligations are for June 26.
c. Data on outlays and obligations are for August 28.

The August numbers suggest that total outlays plus tax cuts will equal approximately $75 billion for the third quarter of calendar 2009. If this prediction is met, between one-fifth and one-quarter of the total $787 billion included in the Act will have been spent by the end of the 2009 fiscal year. This is approximately what was projected by the Congressional Budget Office (CBO) when the Act was passed.[5]

To some degree, the categorization of stimulus into outlays versus tax reductions is largely technical. For example, the Making Work Pay tax credit, which reduced taxes for 95 percent of households, is treated as a tax cut, while the $250 extra payment to seniors and veterans is treated as an outlay. Yet, both are thought to affect economic activity by putting more money into the hands of consumers. For this reason, it is useful to consider a more functional decomposition. The decomposition is not only interesting in its own right, but is necessary for our later multiplier analysis of the impact of the program.

We divide the total dollars of stimulus expended to date into six categories: individual tax cuts and similar payments; the tax cut associated with the adjustment of the Alternative Minimum Tax (AMT); business tax incentives; state fiscal relief; aid to those most directly hurt by the recession; and direct government investment spending. The first three are tax changes of some kind and were established at passage to be roughly one-third of the total package; the second two represent emergency measures and were again estimated to be roughly one-third of the total; the last encompasses a range of direct spending and covers the remaining one-third of the total. At passage, it was anticipated that the tax changes and emergency measures would occur more quickly and direct government spending would be a larger fraction of later expenditures.

We divide the outlays and tax reduction data into these functional categories as follows. Individual tax cuts include the Making Work Pay tax credit, the child tax credit, and a number of

[5] Congressional Budget Office (2009a).

smaller individual tax reductions. We also include direct payments (from Recovery.gov) that were made in lieu of a tax cut to certain groups. These include payments of $250 distributed to individuals who receive Social Security and Supplemental Security Income, Railroad Retirement benefits, or veterans' benefits. The business tax incentives and AMT relief are calculated directly by the IRS as part of their simulation process.[6]

We define state fiscal relief to include just the two main programs in this category: a substantial increase in the Federal government's matching percentage for Medicaid spending (FMAP), and formula grants to state governments for education through the State Fiscal Stabilization Fund. Aid to those directly impacted by the recession includes the increase and extension of unemployment benefits, increased funds for nutritional assistance, and increases in the Temporary Aid to Needy Families (TANF) program. It also includes the government's substantial subsidy of continuing health insurance benefits (COBRA), which is technically treated as a tax cut.

Government investment outlays include everything else. The obvious components are spending on infrastructure, health information technology, research on renewable energy, and other forms of direct spending excluding transfers. Also included here are tax credits for particular types of private spending, such as weatherization or research and experimentation, since these credits are functionally similar to the direct government spending.

Table 2 shows our breakdown of aggregate outlays and tax relief into these functional categories. The table shows that the bulk of the stimulus so far has been concentrated in three areas: individual tax cuts and similar payments, state fiscal relief, and aid to those directly hurt by the recession. This concentration is exactly what was intended and expected when the Act was passed. One key purpose of these types of stimulus was to provide immediate help to an economy in freefall. AMT relief and business tax incentives were always expected to be smaller components of the Act. And, it was anticipated that direct government investment spending would mainly provide support over what was expected to be an extended period of economic weakness. Consistent with this, obligations in the area of infrastructure and other investments, indicating future outlays, are substantial.

[6] The monthly estimates of AMT relief are from unpublished analysis by the Office of Tax Analysis of the Department of Treasury.

Table 2. Fiscal Stimulus by Functional Category

	Through the end of		
	March[a]	June[b]	August[c]
	Billions of Dollars		
Individual Tax Cuts	2.3	29.3	40.0
AMT Relief	0.0	7.6	8.8
Business Tax Incentives	0.1	14.4	17.2
State Fiscal Relief	8.5	28.2	38.4
Aid to Directly Impacted Individuals	0.8	14.4	30.6
Government Investment Outlays	0.0	5.9	16.5
Total[d]	**11.8**	**99.8**	**151.4**

Sources: Recovery.gov; CEA calculations; Updated simulations from the Department of the Treasury (Office of Tax Analysis) based on the Mid-Session Review.

Notes: a. Data on outlays and obligations are for March 27.
b. Data on outlays and obligations are for June 26.
c. Data on outlays and obligations are for August 28.
d. Items may not add to total due to rounding.

III. Evidence of Effects from the Behavior of GDP and Employment

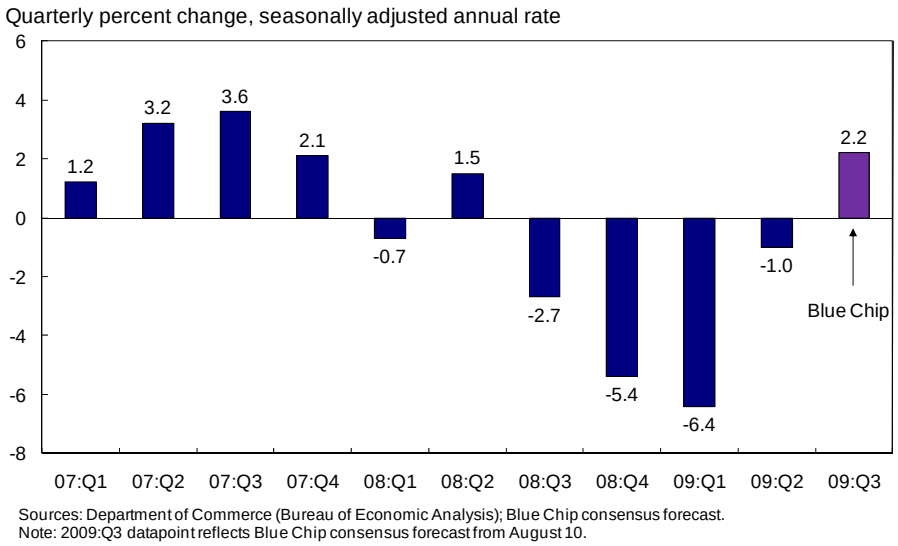
The first way that we investigate the impact of the ARRA is to consider the behavior of real GDP and employment. Are the changes that we have observed in these two key indicators over the past six months consistent with the Recovery Act having a substantial effect?

Before looking at the data, it is important to acknowledge once again that six months is a short period of time for macroeconomic analysis. The only official GDP data that we have under the program is for the second quarter of 2009. While we now have the second estimate of this series, all data are subject to further revision and one observation obviously does not constitute a trend. For employment, we have monthly data through August 2009. These data are again subject to revision, and analysts are well aware that the monthly employment series has a substantial margin of error simply due to inherent sampling difficulties.

A. Real GDP Growth

Figure 1 shows the growth rate of real GDP. After falling considerably and, indeed, progressively more deeply in each of the three quarters before the most recent one, the fall in GDP moderated substantially. After declining at an annual rate of 6.4 percent in the first quarter of 2009, it fell at a rate of 1.0 percent in the second quarter. Figure 1 also shows the consensus forecast for real GDP growth in the third quarter. The August 10th Blue Chip forecast of 2.2 percent is, if anything, on the low end of current forecasts. Macroeconomic Advisers, Goldman-Sachs, and Moody's Economy.com, three prominent members of the Blue Chip panel, are currently forecasting third quarter growth of more than 3 percent at an annual rate.

Figure 1. Real GDP Growth

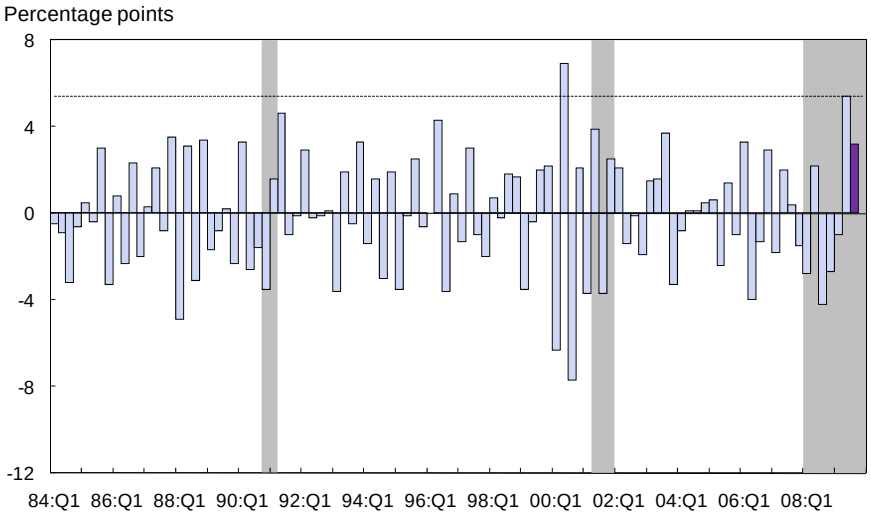


Sources: Department of Commerce (Bureau of Economic Analysis); Blue Chip consensus forecast.
Note: 2009:Q3 datapoint reflects Blue Chip consensus forecast from August 10.

The economy is obviously still far from healthy. Real GDP is far below its previous peak level and millions of Americans are out of work. But economies do not switch from rapid decline to robust growth all at once. Given what we now know about the frightening momentum of economic decline in the first quarter, it would have been hard for the economy to stabilize much faster than it has.

Figure 2 shows the *change* in the growth rate of real GDP over the last 25 years. The rise in GDP growth from the first quarter to the second was the largest in almost a decade, and the second largest in the past quarter century. And, if growth in the third quarter matches the consensus forecast, the turnaround in real GDP growth from the first to the third quarter of 2009 would be the largest in the past 25 years.

Figure 2. Changes in Quarterly Real GDP Growth

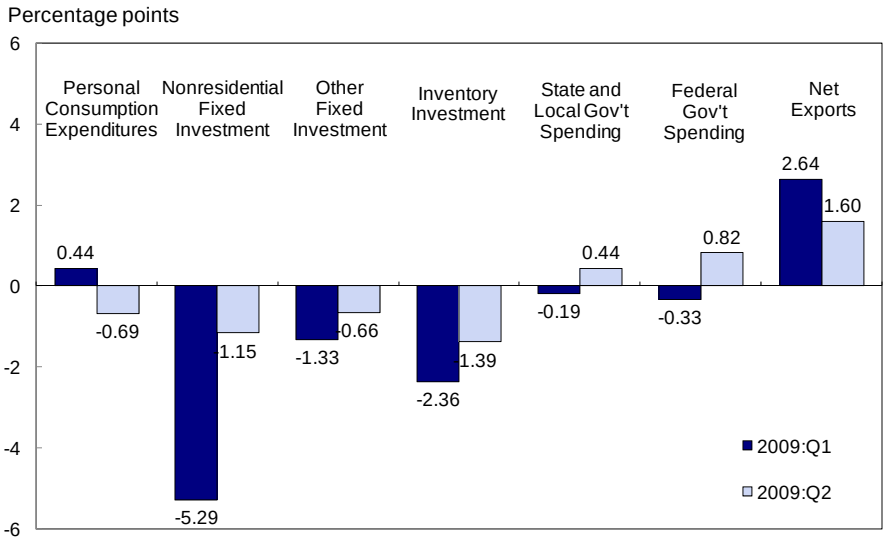


Sources: Department of Commerce (Bureau of Economic Analysis); Blue Chip consensus forecast.
Note: 2009:Q3 datapoint reflects Blue Chip consensus forecast from August 10. NBER recessions are shown in grey.

The timing of the change in trajectory in real GDP growth is certainly suggestive of an important role for the ARRA. An economy in freefall in the months before the ARRA stabilized dramatically in the quarter after, and according to most forecasts will begin growing again two quarters after the stimulus began.

The behavior of key components of GDP is consistent with the ARRA playing a causal role. Figure 3 shows the contributions of each of the main components of GDP to overall growth in the first and second quarters of this year.

Figure 3. Contributions to Real GDP Growth



Source: Department of Commerce (Bureau of Economic Analysis).
Note: Bars sum to quarterly change in GDP growth (-6.4% in Q1; -1.0% in Q2).

The role of the Recovery Act is clearest in state and local spending. Sharp falls in revenues and balanced budget requirements have been forcing state and local governments to reduce spending and raise taxes. But, state and local government spending actually rose at a robust 3.6 percent annual rate in the second quarter of 2009, which helped keep the economy from sinking deeper. This followed two consecutive quarters of decline, and was the highest growth rate in more than five years. The $28 billion of state fiscal relief that had been distributed by the end of the second quarter was almost certainly a key source of this increase.

Another area where the role of the ARRA seems clear is in nonresidential fixed investment – firms' purchases of everything from machines to software to structures. A key source of the more modest decline in GDP is that this type of investment, which fell at a devastating 39 percent annual rate in the first quarter, fell at a much more moderate 11 percent rate in the second quarter. One important component of the Recovery Act was investment incentives, such as bonus depreciation. Businesses received about $14 billion of this type of tax relief in the second quarter, and this may have contributed to slower investment decline.

The behavior of durable goods orders and shipments in July suggest that the stabilization in the second quarter is likely to turn into genuine expansion in this key sector in the third quarter. Core capital goods shipments rose 0.8 percent in July.[7] This component is a direct input to the estimate of equipment and software investment. That orders for durable goods in July were roughly equal to shipments is an indicator that investment is likely to continue at a similar pace later in the quarter.

For the personal consumption component of GDP, the picture is more nuanced. Consumption fell sharply in the second half of last year, but has largely stabilized despite rising unemployment and falling GDP. The Making Work Pay tax credit and the improvements in confidence as a result of the Recovery Act and the Administration's other recovery actions surely contributed to that stabilization.[8] At the same time, the fact that consumption fell slightly in the second quarter after rising slightly in the first quarter could be a sign that households are initially using the tax cut mainly to increase their saving and pay off debt.

Data on real personal consumption expenditures (PCE) for June and July suggest that consumer spending could rise going forward.[9] Real PCE rose 0.1 percent in June and 0.2 percent in July. The Conference Board index of consumer confidence turned sharply upward in August, suggesting that this pattern could continue through the rest of the third quarter.[10] While most analysts expect consumers to remain somewhat cautious going forward and for saving rates to remain elevated, even a modest recovery in consumer spending would be helpful to continued

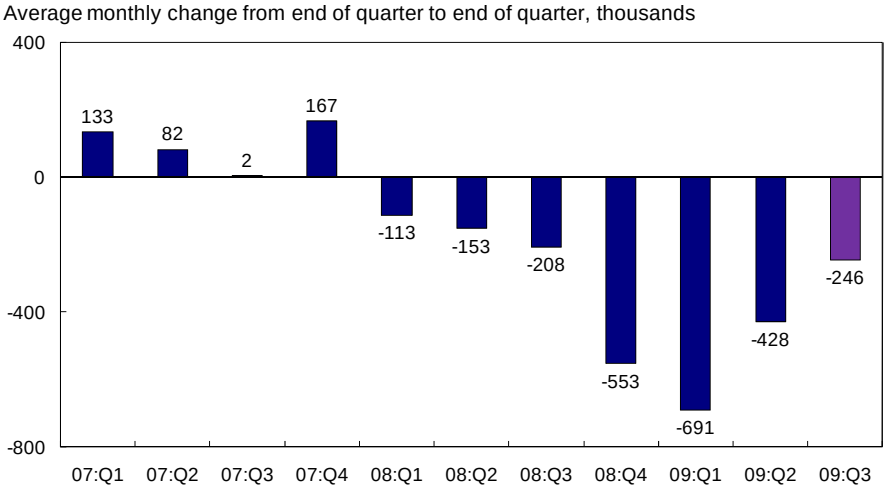
[7] The data are from the U.S. Census Bureau of the Department of Commerce.
[8] The University of Michigan consumer survey showed a sharp increase in approval of government economic policy in April. See Reuters/University of Michigan Surveys of Consumers (2009).
[9] The data are from the Bureau of Economic Analysis of the Department of Commerce.
[10] The University of Michigan index, in contrast, was essentially unchanged in August.

recovery.

B. Change in Payroll Employment

Figure 4 shows the change in payroll employment over the recession. A key indicator of the severity of this recession is the fact that in the first quarter of this year, we lost nearly 700,000 jobs per month. In the second quarter, we lost an average of 428,000 jobs per month. Statistics released on September 4 show that job loss was 276,000 in July and 216,000 in August, for a two-month average loss so far this quarter of 246,000. These job losses are obviously unacceptable. But the change does suggest that we are on the right trajectory.

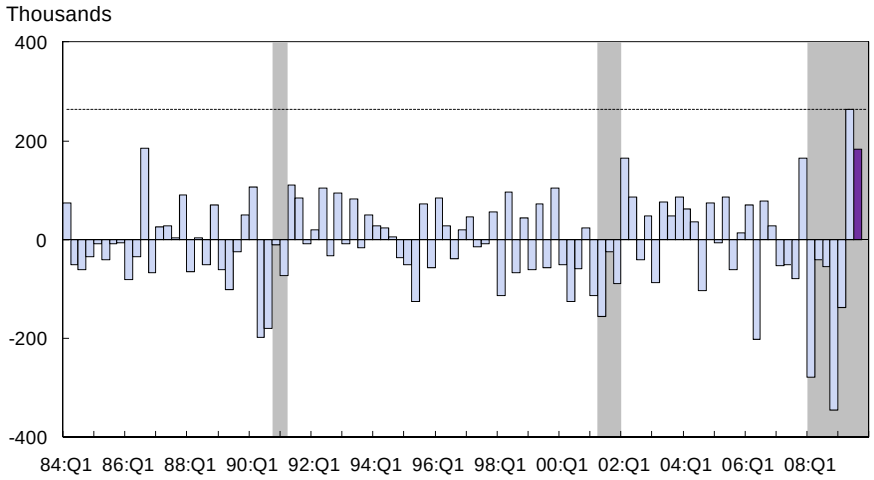
Figure 4. Payroll Employment Growth



Source: Department of Labor (Bureau of Labor Statistics).
Note: 2009:Q3 datapoint reflects the average change in employment in July and August.

Figure 5 shows the *change* in the change in employment. The movement in job loss from the first quarter to the second was the largest in almost 30 years. If the observation for September is equal to the average for July and August, which is a relatively pessimistic assumption, the average monthly job loss for the third quarter would be almost 200,000 less than in the second quarter and 450,000 less than in the first quarter.

Figure 5. Changes in Payroll Employment Growth

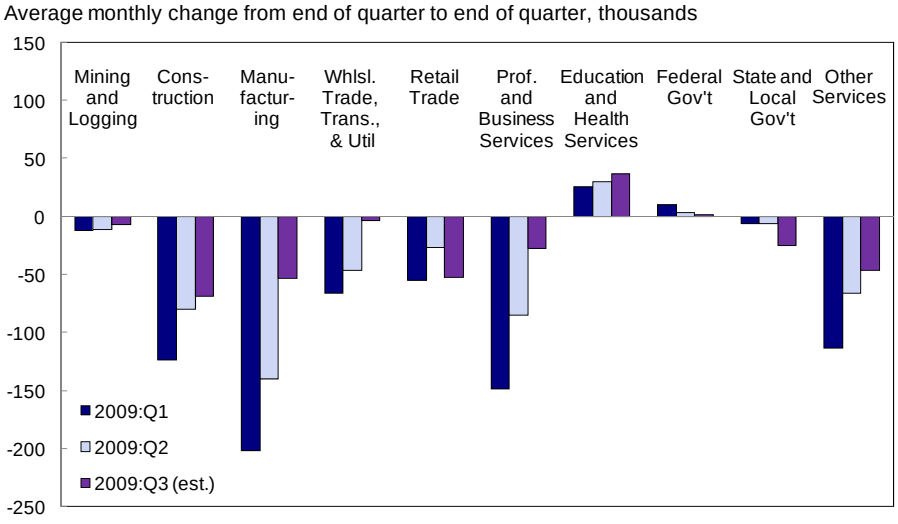


Source: Department of Labor (Bureau of Labor Statistics).
Note: The figure shoes the change from the previous quarter in the average monthly change in employment. 2009:Q3 datapoint reflects the change in average monthly growth in July and August from the average monthly growth in 2009:Q2. NBER recessions are shown in grey.

As with real GDP, the timing of the change in employment behavior is suggestive of a key role for the ARRA and other stabilizing measures taken in February and March. Job losses moderated in the quarter after Recovery Act spending and tax cuts began. They then continued to slow in the subsequent quarter.

Further suggestive evidence is provided by considering the changes in the sectoral composition of job loss between the first, second, and third quarters of 2009. Figure 6 shows the contribution of the change in employment for each quarter in ten key sectors of the economy.

Figure 6. Contributions to Changes in Employment



Sources: Department of Labor (Bureau of Labor Statistics); CEA calculations.
Note: Observations for 2009:Q3 are based on average change in July and August. Bars sum to average monthly change in quarter (-691,000 in Q1; -428,000 in Q2; -246,000 in Q3).

The largest swings in job loss from the first to the third quarters have been in manufacturing and in professional and business services (which includes temporary employment agencies). Since these are both highly cyclical industries, this is the pattern one would expect if the ARRA and other policy actions were moderating the cyclical decline. The pronounced decline in manufacturing job loss could also reflect the effect of business tax incentives on investment.

Another place where there is evidence of the Act's role is in the absence of any acceleration of job losses in state and local government. As described in Section VI, the conjunction of sharp revenue declines and balanced budget requirements created enormous pressures on state and local governments to cut spending and lay off workers. But, as Figure 6 shows, overall state and local government employment has declined relatively little. The obvious candidate explanation is the $38 billion of state fiscal relief provided by the ARRA through August. Similarly, the construction industry, where job losses have moderated substantially despite the fact that the recession has in many ways been centered in residential real estate, could suggest a role for the Recovery Act spending in infrastructure and the First-Time Homebuyer Tax Credit. Some of the moderation of job losses in this sector presumably also reflects other policy actions, such as the Administration's programs to help distressed homeowners and the Federal Reserve's efforts to support the mortgage market.

C. Estimates of Effects of Policy from a Comparison to Baseline Forecasts

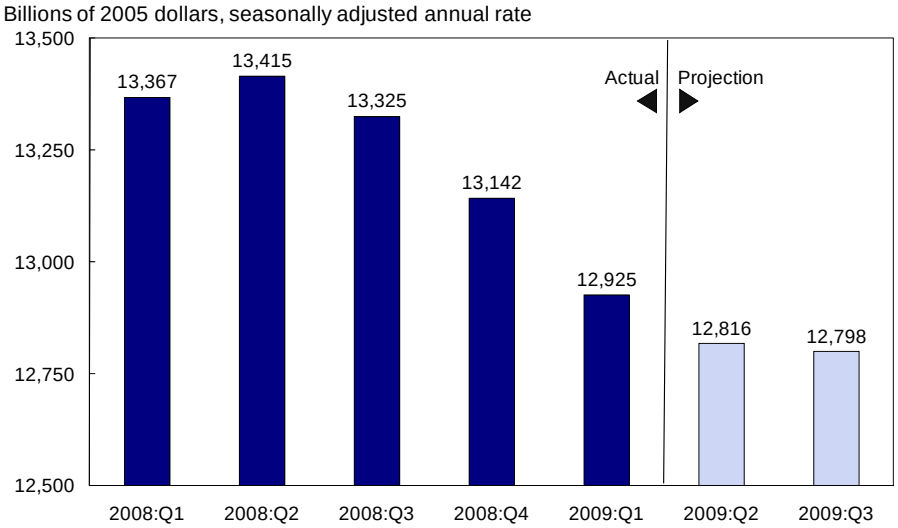
The previous analysis has used the timing and sectoral composition of changes in GDP and employment to suggest an important role for the ARRA. One limitation of this analysis is that it does not attempt to specify what would have happened in the absence of the fiscal stimulus and other recovery actions. It implicitly assumes that in the absence of stimulus, no change would have occurred. To address this issue, in this section we present a sensible statistical forecast of the likely path of GDP and employment in the absence of stimulus. We can then interpret the discrepancy between this forecast and actual developments as a measure of the impact of policy.

There are many ways to construct a statistical baseline forecast. The particular method that we use is to estimate a vector autoregression (or VAR) using the logarithms of real GDP (in billions of chained 2005 dollars) and employment (in thousands, in the final month of the quarter) estimated over the period 1990:Q1-2007:Q4. We include four lags of each variable. Because the estimation ends in 2007:Q4, the coefficient estimates used in the prediction are not influenced by developments in the current recession. Rather, they show the usual joint short-run dynamics of the two series over an extended sample. We then forecast GDP and employment in the second and third quarters of 2009 using actual data through the first quarter of the year. Data through the first quarter include the monetary response to the current crisis, but not the fiscal

stimulus or other actions that took effect after the first quarter. We have experimented with a variety of other ways of projecting the no-stimulus path of GDP. The results of those exercises are generally similar to those we report below.

Figure 7 shows the results of this forecasting exercise for real GDP. Past history predicts that real GDP would continue to decline at a substantial rate in the second quarter. The projected decline (at an annual rate) is 3.3 percent. In the third quarter, real GDP would also be projected to decline, but at the more modest rate of 0.5 percent.

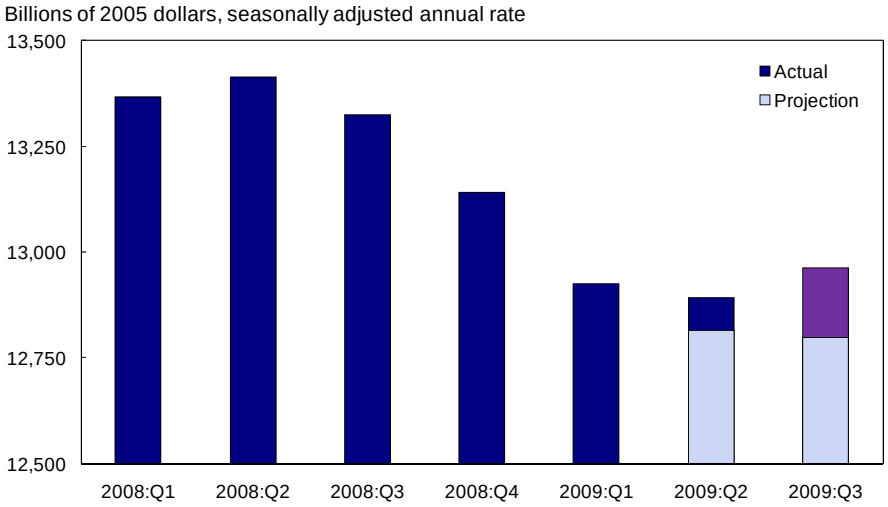
Figure 7. Real GDP: Recent and Projected Levels



Sources: Department of Commerce (Bureau of Economic Analysis); CEA calculations.

Figure 8 superimposes the actual GDP outcome in 2009:Q2 and the consensus forecast outcome in 2009:Q3 on the projections based on past history. The figure shows that real GDP growth in the second quarter, which was -1.0 percent, was 2.3 percentage points higher than the usual time-series behavior would have led one to expect. Assuming that GDP in the third quarter matches the Blue Chip consensus estimate of 2.2 percent, GDP growth in 2009:Q3 will be 2.7 percentage points higher than the statistical baseline prediction. These estimates again suggest that policy actions taken in the winter resulted in large positive innovations to GDP growth.

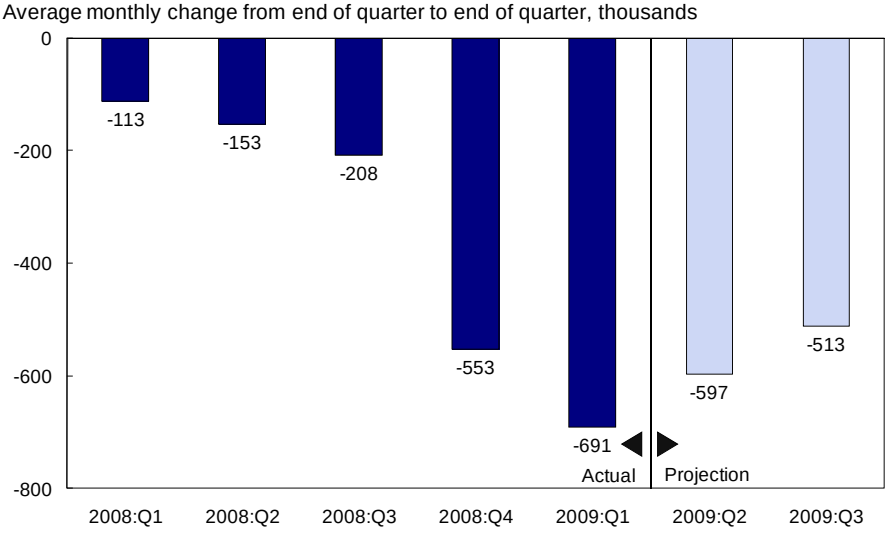
Figure 8. Real GDP: Recent and Projected Levels



Sources: Department of Commerce (Bureau of Economic Analysis); CEA calculations; Blue Chip consensus forecast.
Note: The 2009:Q3 figure for "actual" is the Blue Chip consensus forecast from August 10.

Figure 9 shows the forecast of employment changes using this procedure. The baseline forecast implies further substantial job loss in the second and third quarters. Indeed, the projected average monthly decline in the absence of the Recovery Act is nearly 600,000 jobs in 2009:Q2 and just over 500,000 jobs in 2009:Q3.

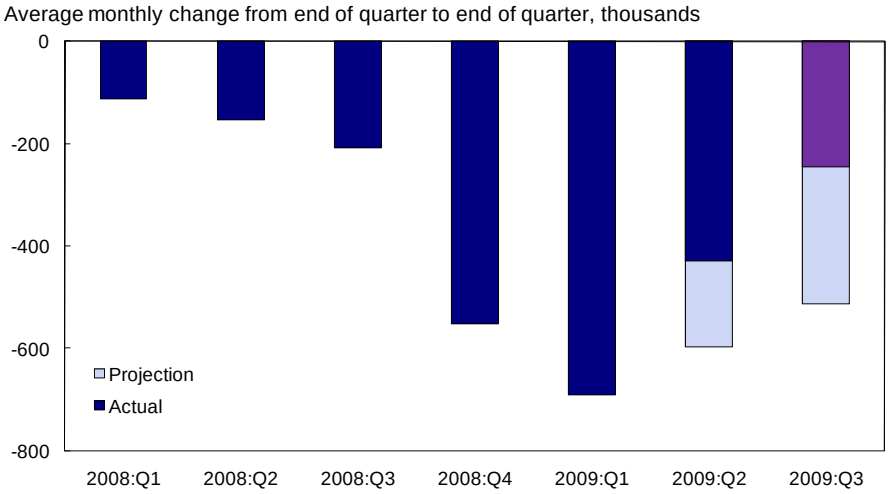
Figure 9. Payroll Employment: Recent and Projected Changes



Sources: Department of Labor (Bureau of Labor Statistics); CEA calculations.

Figure 10 shows that the actual job loss in the second quarter came in substantially lower than the projection. Based on the data to date on employment in 2009:Q3, it appears that job loss will also be substantially smaller in the third quarter than the forecasting model predicts.

Figure 10. Payroll Employment: Recent and Projected Changes



Sources: Department of Labor (Bureau of Labor Statistics); CEA calculations.
Note: 2009:Q3 datapoint for "actual" series reflects the average change in employment in July and August.

The difference between the predicted and actual changes in GDP and employment over the middle two quarters of 2009 can be cumulated to show the difference in the level of the two series as of the third quarter. Table 3 shows this calculation. For real GDP, the finding that growth has been 2.3 percentage points higher than predicted in 2009:Q2 and is likely to be about 2.7 percentage points higher in 2009:Q3 implies that the level of GDP in 2009:Q3 is approximately 1¼ percent higher than a sensible statistical baseline forecast.[11]

Table 3. Estimates of the Effect of the ARRA Using CEA Statistical Projection

	2009:Q2	2009:Q3
	GDP Growth	
Actual GDP Growth	-1.0%	2.2%[a]
Baseline Projection	-3.3%	-0.5%
Difference	+2.3 p.p.	+2.7 p.p.
Estimated Cumulative Impact of Policy on Level		+1.25%
	Employment Change	
Actual Employment Change	-428,000	-246,000[b]
Baseline Projection	-597,000	-513,000
Difference	+169,000	+267,000
Estimated Cumulative Impact of Policy on Level (August)[c]		+1,040,000

Sources: Department of Commerce (Bureau of Economic Analysis); Department of Labor (Bureau of Labor Statistics); CEA calculations.

Notes: a. Blue Chip, August 2009.
b. Average of July and August only.
c. Items may not add to total due to rounding.

[11] The reason the figure is about 1¼ percent rather than 5 percent is that the figures for quarterly GDP growth are expressed at an annual rate.

For employment, the average change in each of the three months of the second quarter was 169,000 less than the baseline forecast. This implies that the level of employment at the end of the quarter was 507,000 higher than the baseline forecast predicted. For each month of the third quarter, actual employment loss is estimated to be an average of 267,000 less than projected. This implies that as of August, employment relative to the projection is another 534,000 higher than at the end of June. Therefore, the level of employment as of August is 1,040,000 higher than the statistical baseline forecast.[12]

This projection methodology provides one way of estimating the impact of the ARRA on employment and the economy. It shows that using the past history of GDP and employment and actual data through the first quarter of 2009, one would have predicted that employment as of August would be about 1 million lower than it actually was. To ascribe much of this difference to the ARRA, the key policy action taken in the first quarter, is certainly plausible. However, other policy actions, such as the Financial Stabilization Plan, monetary policy, and the Federal Reserve's program of buying agency debt and long-term U.S. government bonds, surely contributed to the difference. Also, any other factors not captured by the past history of GDP and employment, such as unusual moves in foreign demand or asset prices, would also be captured in the difference.

Importantly, there is no reason to assume that the overall effect of these omitted policies and other factors was to contribute positively to actual GDP and employment growth. For example, while the various actions to improve financial conditions have surely had a positive impact, the continuing stringency in credit conditions is a development likely to be holding down actual outcomes relative to usual cyclical patterns. Thus, the forecast residuals could either overestimate or underestimate the impact of the ARRA.

D. Sectoral Decomposition of the Estimated Impact on Employment

The previous analysis provides an estimate of the impact of the ARRA on employment relative to the baseline. An obvious question is how those impacts are likely to have been distributed across industrial sectors.

The most important effects of the Recovery Act on the economy to date have been through the general stimulus it has provided. For example, thus far tax cuts and support for those most directly hurt by the recession have been substantial, while direct government spending on specific projects has been relatively small. Thus, the main reason the employment effects of the Act so far have not been evenly distributed across sectors is that some sectors are more sensitive to changes in overall employment than others.

[12] The number is the sum of 507,000 and 534,000. The numbers do not add exactly because of rounding.

The response of employment in individual sectors to changes in overall employment can be decomposed into two components. First, a rising overall level of employment tends to increase employment in each industry in proportion to its share of the overall economy. We refer to this as the "rising tide" effect. Second, some sectors are more sensitive to the state of the business cycle than are others. An example is the employment services industry, most of which is comprised of temporary help services: temporary employment tends to rise much faster than overall employment in business cycle expansions and to decline much faster in recessions. The additional employment due to the Recovery Act has therefore almost certainly produced relative expansion of such procyclical sectors, while countercyclical sectors, such as utilities, health care, and government, have seen their shares of total employment shrink relative to what would have been seen in the absence of stimulus. We refer to the resulting changes in sectoral employment as the "cyclicality effect."[13]

The net effect of the Recovery Act on employment in each sector through its expansionary effects is simply the sum of the rising tide and the cyclicality effects. The rising tide effect is straightforward to measure, as each sector receives a share of the estimated 1.04 million jobs created proportional to the sector's share of overall employment. The first column of Table 4 shows the employment share of each major industrial sector and of selected sub-sectors in August 2009.[14]

Estimation of the cyclicality effect is the more complex part of the decomposition. First, the cyclicality of each sector's employment share must be estimated. Using quarterly data on employment by sector from 1990 through 2007,[15] we estimate the relationship between changes in overall employment and changes in the sectoral employment share. The second column of Table 4 shows the cyclical sensitivity of each sector's employment share. The first few entries indicate that a 1 percent increase in total employment tends to correspond to a 0.29 percent reduction in the share of employment in the mining and logging sector and 1.76 and 0.92 percent increases in the employment shares of the construction and manufacturing sectors, respectively.[16] The cyclicality factors indicate that construction and information are the most procyclical major sectors. The professional and business services and manufacturing sectors are both highly cyclical as well, driven, respectively, by the employment services and durable goods sub-sectors. The most countercyclical sectors are education and health services, government,

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[13] Formally, let $\hat{s}$ and $\hat{E}$ be the sectoral employment share and total non-farm employment, respectively, that would have obtained without the Recovery Act, and let s and E be the values that were actually observed in August 2009. Then the total impact on employment in the sector is $sE - \hat{s}\hat{E} = s(E - \hat{E}) + (s - \hat{s})\hat{E}$. The first term here is the rising tide effect and the second term is the cyclicality effect.

[14] Data are from U.S. Department of Labor (2009).

[15] Data are from U.S. Department of Labor (2009).

[16] These cyclicality factors are the coefficients from regressions of the quarterly change in each sector's share of total non-farm employment on a constant and the quarterly change in log employment, using data from 1990:Q1 through 2007:Q4, divided by the sector's employment share in August 2009.

financial activities, and other services; all of these tend to see rising employment shares when the economy contracts and falling shares when the economy expands.

Table 4. Employment Effects of the Recovery Act by Sector

	Employment Share	Sector Cyclicality Factor	Effect (Thousands of Jobs) Cyclicality	Rising Tide	Total	Share of Total
Mining and Logging	1%	-0.29	-2	6	4	0%
Construction	5%	1.76	85	48	133	13%
Manufacturing	9%	0.92	86	93	179	17%
Durable Goods	5%	1.78	101	57	158	15%
Trade, Transportation, and Utilities	19%	0.16	33	199	232	22%
Retail Trade	11%	0.16	18	117	135	13%
Information	2%	1.27	28	22	51	5%
Financial Activities (FIRE)	6%	-0.51	-31	61	30	3%
Professional and Business Services	13%	0.95	124	132	256	25%
Employment Services	2%	4.55	88	19	107	10%
Education and Health Services	15%	-0.86	-132	153	22	2%
Leisure and Hospitality	10%	-0.21	-21	104	83	8%
Other Services	4%	-0.50	-21	43	22	2%
Government	17%	-0.84	-149	178	29	3%
Total Nonfarm Employment	**100%**	**------**	**------**	**1,040**	**1,040**	**100%**

Sources: Department of Labor (Bureau of Labor Statistics); CEA calculations.
Note: Data are from August 2009.

The Recovery Act, by stimulating total employment, has led to increases in the employment shares of procyclical industries and reductions in the shares of countercyclical industries relative to what would have happened otherwise. The resulting cyclicality effects on sectoral employment are shown in the third column of Table 4.[17] Construction and manufacturing have each gained about 85,000 jobs relative to the baseline due to cyclicality factors, while professional and business services has gained nearly 125,000 jobs. More than all of the cyclical manufacturing growth is in the durable goods sector (which gained 101,000 jobs through this channel)[18] while the professional services growth is largely due to the employment services industry (88,000 jobs gained relative to the baseline). By contrast, education and health services and government each saw their job creation reduced by over 130,000 jobs relative to the baseline due to the cyclicality effect, and financial activities by 31,000 jobs.

[17] These are calculated by multiplying the regression coefficients from the previous footnote by the change in log employment attributable to the Recovery Act (from the analysis in the previous section) to obtain the change in the sectoral employment share attributable to the cyclicality effect of the Act. That is, we estimate $(s - \hat{s})$ as $\beta(\ln E - \ln \hat{E})$, where β is the regression coefficient. The resulting change in the sectoral employment share is then multiplied by our estimate of the employment level that would have obtained without the act, $\hat{E}$ = 130.2 million, to obtain the cyclicality effect on sectoral employment levels.

[18] The cyclicality effect on durable goods can be larger than that on all manufacturing because non-durable goods employment is (relatively) countercyclical, with declining employment shares in expansions.

The fourth column shows the rising tide effects. These are all necessarily positive, as no industry has a negative share of total employment. In each case, industries with negative cyclicality effects saw those more than offset by positive rising tide effects, leading to a net positive effect on total employment relative to the no-stimulus baseline. These net effects are shown in the fifth column, while the last column shows the distribution across sectors. All major industries were assisted, with the largest shares of jobs created by the Recovery Act in professional and business services; trade, transportation, and utilities; manufacturing; and construction.

Of course, these figures are only estimates. One factor that could cause the distribution of job creation to differ from its normal cyclical pattern is the unusual nature of the recession. For example, the fact that the recession has been unusually concentrated in construction may mean that the fraction of jobs saved or created by fiscal stimulus in this recession that are in construction is different than it usually would be.

Another factor that could cause the actual distribution to differ from our estimates is the specifics of the Recovery Act. Most obviously, the fact that a substantial portion of spending under the Act thus far has consisted of aid to the states suggests that estimates based on normal cyclical behavior are likely to underestimate the effects of the Act on state and local government employment.

E. State Decomposition of the Estimated Impact on Employment

Our comparison to baseline projections suggests that the ARRA and other recovery programs have resulted in employment as of August that is just over 1 million higher than it otherwise would have been. There is obviously much interest in how these employment effects have been distributed across states. In this section, we make an initial attempt to provide such a state-by-state breakdown. However, it is important to emphasize that these disaggregate estimates are inherently more speculative and uncertain.

Because there is no perfect way to measure state-level effects, we pursue three approaches to decomposing employment impacts across states. Our first method allocates jobs according to states' shares of national non-farm employment as of March 2009.[19] Georgia, for example, had 3.0 percent of all employment in the country in March, so is allocated 3.0 percent of total job creation. This is akin to the "rising tide" component of job creation discussed above.

Our second method allocates jobs according to the distribution of Recovery Act outlays, as reported by Recovery.gov on August 28, 2009. Georgia has received 2.8 percent of total outlays, so is estimated to receive 2.8 percent of total job creation. This method provides a more

[19] U.S. Department of Labor (2009). We use seasonally adjusted estimates of total nonfarm employment.

direct measure of where ARRA impacts are likely to be felt than does the "rising tide" method, but it has an important drawback. Only a portion of the overall Recovery Act stimulus is included in the Recovery.gov state-level figures. The most important stimulus not included in this approach are the various types of tax relief, which, as discussed earlier, comprise almost half of total spending plus tax cuts to date. Tax cuts are likely more evenly distributed across states than are outlays, so our use of outlays likely overstates the unevenness of employment effects. Similarly, this method assumes that all of the employment effects of spending in a state are felt within the state. In fact, however, there are important spillovers across states. Thus again, this approach is likely to exaggerate the differences among states.

Our third method relies on the sectoral decomposition of employment effects from the previous subsection. We assume that any jobs saved or created in a particular industrial sector (for example, mining and logging) are distributed across states in the same way as are existing jobs in that sector.[20] Georgia has only 1.4 percent of national employment in mining and logging, so is assumed to receive only 1.4 percent of employment effects in that industry. By contrast, Georgia has nearly one-quarter of national textile product mill employment, so any employment impacts in that industry are assigned disproportionately to Georgia. Summing across 42 industries, we obtain the total impact on Georgia employment.[21] The procedure is repeated for each state to obtain the distribution across states.

None of these three approaches does a perfect job of measuring the geographic distribution of employment effects, and each has advantages and disadvantages relative to the others. Thus, to obtain a reasonable estimate of state-level job impacts, we use a simple average of the three approaches. This average indicates that the ARRA has saved or created nearly 31,000 jobs in Georgia, 3.0 percent of the national total. Estimates for all fifty states, plus the District of Columbia, are reported in Table 5.

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[20] Employment by state and industry is drawn from data published by the U.S. Department of Labor (2009). We use data from the March 2009 Current Employment Statistics to determine state employment shares and data from the 2008 Quarterly Census of Employment and Wages to determine state-by-industry employment. Because of limitations in the available data, the analysis here (unlike that used for the sectoral analysis above) uses data beginning in 1990:Q2.

[21] For this analysis, we use a finer disaggregation of industries than was reported in Table 4. Manufacturing is divided into 21 sectors (for example, fabricated metal products). Trade, transportation, and utilities are divided into four sectors (wholesale trade, retail trade, utilities, and transportation/warehousing); financial activities into two (finance/insurance, and real estate/rental/leasing); professional and business services into five (professional/technical services, management of companies, employment services, other administrative/support services, and waste management/remediation); education and health into two (educational services and health care/social assistance); leisure and hospitality into two (arts/entertainment/recreation and accommodation/food services). For data sources and methods used in the sectoral decomposition, see the previous subsection.

Table 5. Estimated Impact of the ARRA on Employment by State

State	Jobs Impact	State	Jobs Impact
	Thousands		Thousands
Alabama	13.5	Montana	2.9
Alaska	2.2	Nebraska	5.6
Arizona	21.4	Nevada	9.1
Arkansas	8.6	New Hampshire	4.0
California	139.7	New Jersey	31.2
Colorado	16.1	New Mexico	5.3
Connecticut	12.9	New York	72.5
Delaware	3.0	North Carolina	31.5
District of Columbia	4.9	North Dakota	2.2
Florida	55.4	Ohio	38.9
Georgia	30.8	Oklahoma	11.8
Hawaii	4.2	Oregon	13.6
Idaho	4.6	Pennsylvania	40.9
Illinois	50.4	Rhode Island	4.1
Indiana	24.4	South Carolina	13.7
Iowa	10.9	South Dakota	2.8
Kansas	9.1	Tennessee	20.0
Kentucky	13.1	Texas	71.9
Louisiana	12.7	Utah	9.5
Maine	4.8	Vermont	2.3
Maryland	17.4	Virginia	24.0
Massachusetts	27.4	Washington	22.6
Michigan	36.0	West Virginia	5.1
Minnesota	20.1	Wisconsin	22.1
Mississippi	8.3	Wyoming	1.8
Missouri	19.2		

Source: CEA estimates based on data from the Current Employment Statistics and the Quarterly Census of Employment and Wages.

Notes: Entries sum to the estimated cumulative impact of policy on level in Table 3 (1,040,000 jobs impacted). Items may not add to total due to rounding.

Of course, simply because their populations are larger, we estimate that larger states have seen larger jobs impacts. Similarly, because their employment is more cyclically sensitive, industrial states are estimated to have had larger employment effects relative to their populations. Finally, both because of their industrial composition and because state fiscal relief and aid to those directly impacted have been larger in states hit harder by the recession, we estimate that states with higher unemployment rates at the time of passage have seen larger employment effects of the ARRA relative to their populations.

IV. ESTIMATES OF EFFECTS FROM ECONOMIC MODELS

This section examines estimates of the output and employment effects of the ARRA from macroeconomic models of the effects of various types of fiscal stimulus. The first part of the section describes the Council of Economic Advisers' estimates derived from those models. We then consider the estimates from a wide range of public and private forecasts and analysts.

A. CEA Model-Based Estimates of the Effect of the ARRA

A natural way to estimate the effects of the ARRA on employment and GDP is to use existing estimates of the macroeconomic effects of fiscal policy. This was one approach used by the CEA to estimate the likely effects of the Act based on the information available soon after the Act was passed.[22] This methodology uses mainstream estimates of economic multipliers for the effects of fiscal stimulus.

The main difference from our earlier analysis is that we can now use figures on actual outlays and tax relief under the Act through August, rather than prospective estimates of what the likely spendout would be. To use the actual spendout figures, we need to address the fact that our approach is designed to work with quarterly data, while at the moment there are data on spendout only through the end of August. We therefore assume that spendout in July and August represents two-thirds of spendout in 2009:Q3. The multipliers are applied to the resulting quarterly figures. This yields estimates of the effects on employment and GDP as of the third quarter of 2009. Because August is the middle month of the quarter, the quarterly employment effect can reasonably be interpreted as an estimate of the employment effect in August.[23]

This exercise, like the one based on statistical projections, will obviously not yield exact figures for the effects of the ARRA. To begin with, there is uncertainty about the size of the economic effects of a "typical" increase in government purchases or a "typical" tax cut. There is

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[22] Council of Economic Advisers (2009).

[23] We also make several smaller adjustments to the earlier analysis to reflect the fact that our goal here is largely to estimate the effects at a particular point, rather than to estimate the broad contours of the effects. First, an important component of spending under the Act to date (though not over its entire life) consists of one-time payments to seniors, veterans, and the disabled. These constituted $13 billion of the $29 billion of individual tax cuts and similar payments through the end of June shown in Table 2. In terms of short-run macroeconomic effects, such one-time payments are similar to one-time tax rebates, whose effects are smaller than those of tax cuts that are perceived as permanent. The analysis therefore uses multipliers for the one-time payments equal to one-half the multipliers for conventional tax cuts. Second, we assume that recipients of the various types of aid to those directly impacted by the recession (such as extended unemployment insurance) spend two-thirds of the funds in the quarter they receive them and one-third in the following quarter (rather than spending all of the funds within the quarter). Third, we assume that the impact of state fiscal relief on state budget decisions is spread over the quarter that funds are transferred to the states and the subsequent three quarters (rather than assuming the effects all occur with a one-quarter lag). Finally, we adjust the multipliers for investment incentives to account for the fact that while the size of those incentives is similar to what was assumed in the earlier analysis, the timing of the revenue changes associated with them involves larger reductions in 2009 and 2010 and larger increases in 2011 and beyond.

even more uncertainty about the precise timing of those effects, and modest changes in timing have noticeable effects on the impact at a specific point in time. In addition, the current exceptional economic environment could make the effects of stimulus somewhat larger or smaller than normal, or could cause them to occur somewhat more or less quickly. Finally, the ARRA – appropriately – was not just typical stimulus. For types of stimulus that are used less frequently, there is even greater uncertainty about the size and timing of the macroeconomic effects.

The results of this analysis are shown in Table 6. They imply that the ARRA is having a substantial beneficial effect on production and employment. Specifically, they suggest that the ARRA added roughly 3.1 percentage points to GDP growth in the second quarter and is likely to add roughly 3.6 percentage points to GDP growth in the third quarter. The approach also suggests that the Act increased employment relative to what it otherwise would have been in the second quarter (or May) by about 434,000 jobs, and that it is likely increasing employment in the third quarter (or August) by about 1.159 million jobs. These estimates are broadly similar to the estimates described in Section III obtained by comparing employment and output with projections of how those variables would have behaved in the absence of stimulus. They are also broadly similar to the estimates of many knowledgeable outside observers that we discuss below.

Table 6. Estimates of the Effect of the ARRA Using CEA Multiplier Model

	2009:Q2	2009:Q3
GDP Growth (Percentage Points)	+3.1	+3.6
Employment	+434,000	+1,159,000

Source: CEA calculations.

B. Comparison with Other Estimates of the Effects of the ARRA

Many other economists and forecasters have estimated the likely effects of the Recovery Act. Most of those estimates are based on formal macroeconomic models. These estimates provide further evidence about the effects of the act, and serve as a check on the reasonableness of our own estimates.

Table 7 reports estimates of the contribution of the ARRA to GDP growth in the second and third quarters of 2009 from an array of public and private forecasters.[24] The first row

[24] The sources are as follows. CBO: Congressional Budget Office (2009b, p. 33). Goldman Sachs: Goldman Sachs (2009). IHS/Global Insight: described in IHS/Global Insight (2009); exact numbers from Nigel Gault, email communication, August 28, 2009. James Glassman, J.P.Morgan Chase: Glassman (2009). Macroeconomic Advisers: Macroeconomic Advisers (2009a, 2009b). Moody's economy.com: described in Zandi (2009); exact

repeats the estimates from Section III based on the comparison of actual outcomes with projections of the normal evolution of the economy, and the second row shows our model-based estimates described above. The next two rows show the low and high projections prepared by the Congressional Budget Office.[25] The estimates from both of our approaches are well within the CBO range, and are generally in its lower part. To put the numbers in context, recall the real GDP fell at an annual rate of 1.0 percent in the second quarter. An estimate that the ARRA added 2.3 percentage points to GDP growth in that quarter implies that in the absence of stimulus, real GDP would have fallen at a 3.3 percent annual rate.

Table 7. Estimates of the Effects of the ARRA on GDP Growth

	2009:Q2	2009:Q3
	Percentage Points, Annual Rate	
CEA: Projection Approach	+2.3	+2.7
CEA: Model Approach	+3.1	+3.6
CBO: Low	+1.9[a]	+1.9[a]
CBO: High	+5.1[a]	+5.1[a]
Goldman Sachs	+2.2	+3.3
IHS/Global Insight	+2.3	+2.3
James Glassman, J.P.Morgan Chase	+3.0	+4.0
Macroeconomic Advisers	+2.1	+1.9
Mark Zandi, Moody's Economy.com	+2.8	+3.6
NABE Survey	+0.5	+0.8[b]

Sources: See text for details.

Notes: a. Data reflect the average effect on growth, 2009:Q2 - 2009:Q4.

b. Approximate. NABE reports that about 1/3 of respondents expect the Recovery Act to add less than 0.5 percentage points to growth in the second half of 2009, and slightly over half expect it to add between 0.5 and 1.5 points; the remainder presumably expect it to add more than 1.5 points.

The remaining lines of the table show the private sector estimates that we have been able to gather. These estimates are generally similar to the estimates from our projection-based approach and slightly below those from our model-based approach.

The one set of private sector estimates that stands out as much lower than all the others is that from a survey conducted by the National Association of Business Economics. Since these are the results of a survey, we have no information about the reasoning behind them. The survey reflects the views of a substantial number of economists. At the same time, the average amount of effort devoted to each individual response to the survey was almost certainly much smaller

numbers from Mark Zandi, email communication, September 4, 2009. NABE Survey: National Association of Business Economics (2009).

[25] CBO estimated a range for the likely effects on the level of GDP in 2009:Q4. We convert these into growth projections by assuming that the Recovery Act would have no impact on growth before 2009:Q2 and that the effect on growth would be uniform over 2009:Q2-2009:Q4. Consider, for example, CBO's low estimate that the Act would raise the level of GDP in 2009:Q4 by 1.4 percent. The constant growth rate that would generate a rise of 1.4 percent over three quarters is 0.46 percent per quarter (since $1.0046^3 = 1.014$). At an annual rate, this is 1.9 percent (since $1.0046^4 = 1.019$).

than the effort that went into the other estimates reported in the table.

There are far fewer estimates of the employment effects of the Recovery Act. The ones that we have been able to gather are reported in Table 8, together with the estimates from our two approaches.[26] Again, our estimates are well within the ranges of other projections.

Table 8. Estimates of the Effects of the ARRA on Employment

	2009:Q2	2009:Q3
CEA: Projection Approach	+507,000[a]	+1,040,000[b]
CEA: Model Approach	+434,000	+1,159,000
CBO: Low	+300,000	+600,000
CBO: High	+767,000	+1,533,000
IHS/Global Insight	+250,000	+690,000
Macroeconomic Advisers	+250,000	+620,000
Moody's Economy.com	+502,000	+1,073,000

Sources: See text for details.
Note: a. Datapoint reflects an estimate for June.
b. Datapoint reflects an estimate for August.

This discussion shows that there is nothing unusual about CEA's estimates of the impact of the Recovery Act on GDP growth and employment: our estimates are consistent with a broad, though not universal, consensus of numerous professional forecasters. The fact such a wide range of public and private forecasters broadly agree with our assessment should increase confidence that the Act is having a substantial stimulative effect.

Given the widespread agreement that the ARRA is contributing strongly to real GDP growth and the change in employment, it is natural to wonder why both GDP and employment have continued to fall since the Act was passed. The answer rests in the baseline trajectory of the economy. The contractionary shocks that hit the U.S. and world economy last fall and winter were so strong that they set in motion an economic decline of nearly unprecedented proportions. Indeed, the downward trajectory was more severe than most forecasters predicted and than economic indicators suggested at the time the ARRA was proposed and passed. In an economy in a severe downward slide, fiscal stimulus naturally first manifests itself as a smaller contraction. Only once recovery is established do the effects show up in GDP increases and employment gains.

[26] The CBO estimates are from Congressional Budget Office (2009c). The estimates from Macroeconomic Advisers are from an email communication, August 10, 2009. The sources for the other estimates are the same as in Table 7.

V. Evidence of Effects from the Experience of Many Countries[27]

Nearly every industrialized country and many emerging economies undertook fiscal stimulus in response to the financial and economic crisis. By supporting demand throughout the world, these policies have helped to soften the downturn. They also allow us to examine another type of evidence about the effects of stimulus.

A. Fiscal Stimulus around the World

As the full onset of the world financial crisis was being realized at the start of 2009, many countries decided that an aggressive fiscal stimulus was necessary. The logic was similar to that behind the ARRA. Aggregate demand was falling rapidly, and in many cases conventional monetary policy was largely out of ammunition. It was hoped that government spending and tax cuts could step into the breach and provide the necessary lift to the economy to prevent a slide into a deep recession or worse.

The stimulus measures used in this analysis are an average of three published estimates of stimulus across countries: an International Monetary Fund (IMF) report on stimulus in G20 countries, a Brookings Institution report on stimulus announcements, and an Organisation for Economic Co-operation and Development (OECD) report on stimulus.[28] The estimates are typically quite close. Table 9 shows the amount of fiscal stimulus estimated to take effect in 2009 as a share of GDP.[29] Although many countries (including the United States) have stimulus that will extend beyond 2009, the estimates below are strictly for the portion of stimulus that will be done in 2009. The strength of the stimulus varied across the world, ranging from Italy's near non-existent stimulus (0.1 percent of GDP) to Korea's 3.0 percent of GDP. The average stimulus for the full sample is 1.6 percent of GDP, and for the OECD is 1.5 percent. The U.S. stimulus was above average, estimated at 2 percent of GDP for 2009.

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[27] Many of the results in this section are developed in greater detail in the CEA report "The Effects of Fiscal Stimulus: A Cross-Country Perspective."

[28] IMF (2009); OECD (2009a); Brookings Institution (2009). Both the IMF and OECD measures include any stimulus announcements up through the middle of June 2009. The Brookings figures were not updated after March, so stimulus announced in the late spring is not included. Including the Brookings estimates in the average thus slightly down-weights any stimulus announced after March. Given that we seek to measure the impact on second quarter GDP, this is appropriate. The Brookings estimates are largely based on a prior IMF report, although they include calculations by Brookings staff as well. A simple average of just the IMF and OECD estimates is correlated with our measure at 0.98, so the decision to include the Brookings estimates does not play a substantial role.

[29] The sample of countries is based on data availability for stimulus, private forecast data, and actual real GDP growth in 2009:Q2. There is a slight difference between this table and that in Romer (2009). Since that speech, we have found a Brookings estimate for stimulus in South Korea. Adding that to our average slightly lowers the estimate of South Korea's stimulus and shifts the accompanying figures slightly. No qualitative conclusions change. In addition, three countries have not released second quarter GDP data and have been dropped from the sample.

Table 9. Discretionary Fiscal Stimulus in 2009 around the Globe

Country	Share of GDP	Country	Share of GDP
Australia[a]	2.2%	Korea[a]	3.0%
Canada[a]	1.7%	Mexico[a]	1.4%
China	2.6%	Norway[a]	1.2%
Czech Republic[a]	1.6%	Poland[a]	0.8%
France[a]	0.6%	Russia	2.9%
Germany[a]	1.5%	South Africa	2.2%
India	0.6%	Sweden[a]	1.4%
Indonesia	1.4%	Switzerland[a]	0.6%
Italy[a]	0.1%	United Kingdom[a]	1.5%
Japan[a]	2.4%	United States[a]	2.0%

Source: CEA estimates based on IMF, OECD, and Brookings data.
Note: a. Country is an OECD member.

Stimulus plans were not simply a function of how bad the shock in 2009 was expected to be. In fact, there is no correlation between the size of stimulus and forecasts for the performance of the economy in the second quarter of 2009.[30] Countries that experienced a bigger drop in the fourth quarter of 2008 undertook a slightly larger stimulus, but this relationship is not statistically significant and the relationship can explain only a small share of stimulus variation.[31]

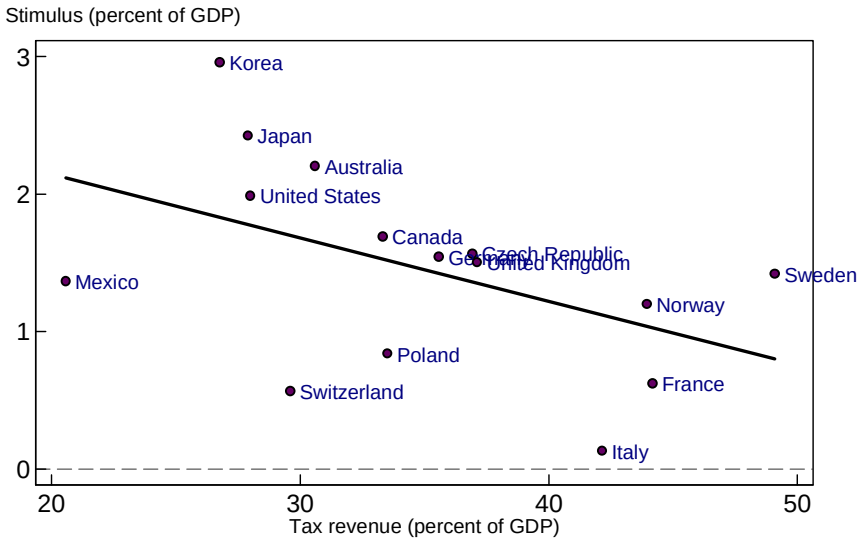
The size of discretionary stimulus is correlated with other fiscal policy, however. Discretionary stimulus is not the only way fiscal policy responds to a crisis; automatic stabilizers (unemployment insurance, welfare, reduction in taxes collected due to lower payrolls, and so on) are triggered when an economy slows down. The size of automatic stabilizers present in the economy appears to be negatively correlated with the size of discretionary stimulus. We use the level of taxation in the economy as a proxy for automatic stabilizers. Countries with large levels of taxation see immediate automatic stabilizers as any lost income immediately reduces taxes. Those same countries often tend to have more generous social safety nets (funded by their higher taxes). As Figure 11 shows, those countries that already had large automatic stabilizers in place as of 2006 appear to have done less discretionary fiscal stimulus.[32]

[30] A regression of stimulus size on the difference between predicted growth in 2009:Q2 and average growth in the 2000's generates a coefficient close to zero (-0.07) with a standard error of 0.10 and an R^2 of 0.03. The data on forecasts are described in more detail below.

[31] The correlation between fourth quarter GDP growth and size of stimulus is -0.29. Regressing stimulus on fourth quarter GDP growth generates a statistically insignificant coefficient of -0.037, suggesting a 1 standard deviation difference in fourth quarter growth rates (roughly 6 percentage points) leads to a 0.2 percent of GDP larger stimulus. The R^2 is 0.09, thus explaining a small amount of the variation. See CEA, "The Effects of Fiscal Stimulus: A Cross-Country Perspective," for more details.

[32] A consistent measure of level of taxation is only available across the OECD countries. We use the measure of taxation in the economy from OECD (OECD, 2009b). The correlation between the stimulus and the tax share is -0.48.

Figure 11. Stimulus and Tax Share of the Economy



Sources: OECD; IMF; Brookings Institution; CEA calculations.

Note: the regression line is stimulus = 3.1 - 0.046 * (tax share).
The coefficient on tax share is significant at the 90% confidence level. The R-squared is 0.23.

B. The Impact of Stimulus on Growth

Countries have different normal rates of growth, and they have experienced the shock of this crisis to different degrees. Thus, a key element of examining the cross-country evidence about the effects of stimulus is to build a counterfactual: what would we expect to have happened to countries' economies in the absence of stimulus?

We use as our measure of the counterfactual the private sector forecast by J.P.Morgan of GDP growth for the second quarter of 2009 that was made in November 2008.[33] The J.P.Morgan forecast has the advantage over market average expectations of being reported far in advance (before any stimulus is announced) and of having public forecasts for a wide set of countries made on a specific day.[34] We take these expectations and subtract them from current performance to get a measure of whether countries outperformed expectations. Current performance is measured by the actual GDP growth rate in the second quarter of 2009.[35]

[33] See J.P.Morgan (2008).

[34] As a robustness check, we also explore a simple time-series forecasting model to predict a "no-stimulus" growth rate across countries. Results using this method are consistent with the results provided here. They can be found in the CEA report "The Effects of Fiscal Stimulus: A Cross-Country Perspective."

[35] For Norway we use the Mainland GDP series (which is what J.P.Morgan forecasts), and we use the J.P.Morgan seasonal adjustment of Russia's data given that this is the series that is consistent with their forecast. China and the Czech Republic's flash estimate release only year on year changes at the quarterly frequency, so we use J.P.Morgan's estimate of what those yearly changes imply for quarterly growth. See J.P.Morgan (2009).

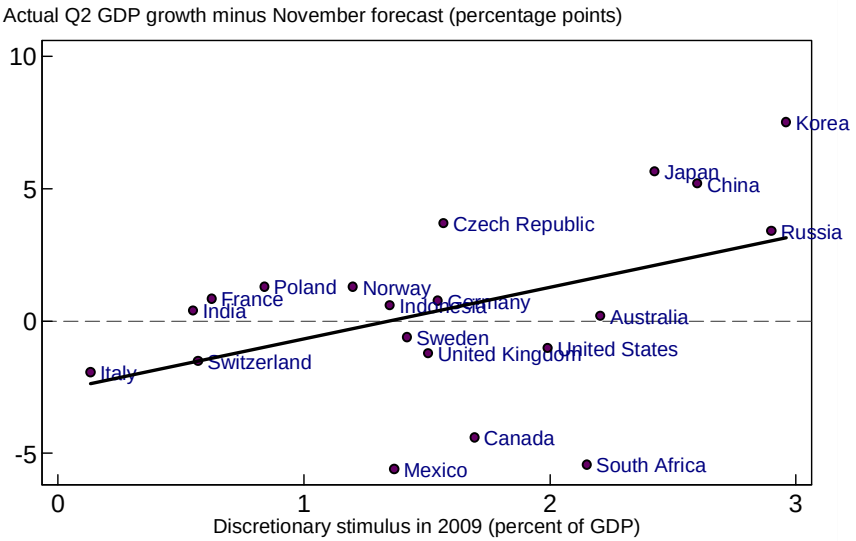
If countries that experienced larger negative shocks adopted greater stimulus, the relationship between stimulus and the difference between actual performance and pre-crisis expectations will tend to understate the benefits of stimulus. As noted above, however, our first effort to look for such an effect – the examination of the relationship between stimulus and pre-stimulus expectations of growth in 2009:Q2 – finds no evidence of such behavior. However, this does not fully eliminate the possibility that one source of the cross-country variation in stimulus was variation in the size of shocks.

A more serious problem is the negative correlation between discretionary stimulus and automatic stabilizers. Countries with smaller discretionary packages tended to have larger swings in automatic policy. As a result, total fiscal stimulus in the countries with low discretionary stimulus is more similar to the countries with high discretionary stimulus than the measure of discretionary stimulus alone suggests. Thus, examining the relationship between discretionary stimulus and growth performance relative to expectations could underestimate the impact of stimulus on growth.

A final possible confounding factor is the possibility of other policies that are correlated with discretionary fiscal policy. If monetary policy stimulus or some other policy that increases growth is positively correlated with discretionary stimulus, we might mistakenly attribute some of the impact of the other policy to fiscal stimulus. Alternatively, if countries that pursued less discretionary stimulus used other policies more, our analysis will understate the effects of stimulus. For all of these reasons, our analysis should be interpreted with caution.

Figures 12 and 13 show the relationship between discretionary stimulus and the difference between actual growth in the second quarter and pre-crisis expectations for the full sample of countries and for OECD countries only. There is a clear upward sloping relationship. Countries that undertook larger stimulus outperformed expectations when compared to countries that undertook smaller stimulus. The relationship is even stronger for the OECD-only sample. Some of the outliers in Figure 12 are non-OECD countries like South Africa. It is sensible that the relationship may be more consistent across the OECD countries, which have more similarities in the way fiscal policy is pursued, the channels through which it affects the economy, and the extent to which the shock of the recession hit them.

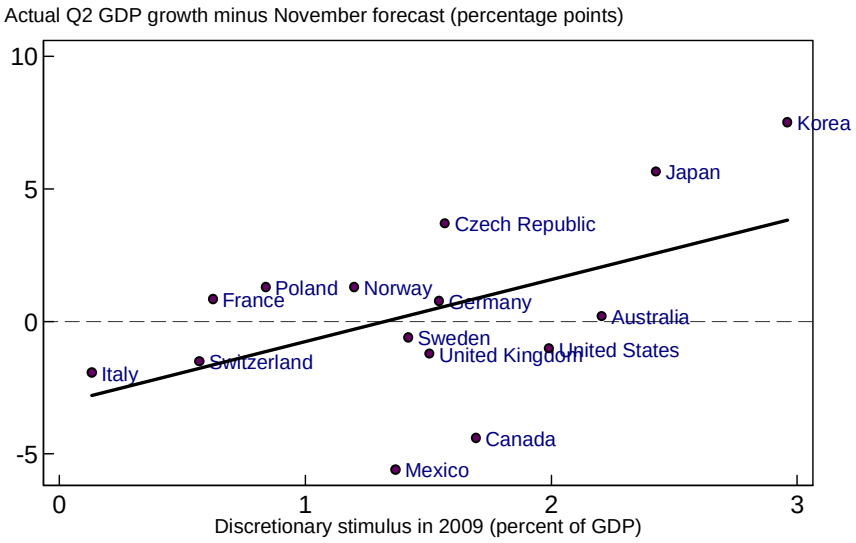
Figure 12. Outperforming Expectations and Stimulus, Full Sample



Sources: OECD; IMF; Brookings Institution; J.P.Morgan; CEA calculations.

Note: the regression line is (growth - forecast) = -2.6 + 1.95 * stimulus.
The coefficient on stiumulus is significant at the 95% confidence level. The R-squared is 0.20.

Figure 13. Outperforming Expectations and Stimulus, OECD Sample



Sources: OECD; IMF; Brookings Institution; J.P.Morgan; CEA calculations.

Note: the regression line is (growth - forecast) = -3.1 + 2.34 * stimulus.
The coefficient on stiumulus is significant at the 95% confidence level. The R-squared is 0.26.

In both samples, this relationship is statistically significant. Further, despite including only one explanatory variable – size of stimulus – we can explain a considerable amount of the variation in how well countries performed relative to expectations. The R^2 is 0.20 for the full sample and 0.26 for the OECD sample.

The coefficient on stimulus is 1.95 in the full sample and 2.34 for the OECD sample. Taken literally, this would suggest that a stimulus of 1 percent of GDP led to faster growth in the second quarter of 2 percentage points (at an annualized rate).[36] This would be a substantial multiplier. We do not know the precise distribution of stimulus spending by quarter. If more than a quarter of the spending was in 2009:Q2, we might want to interpret the multiplier as somewhat smaller.

The results suggest that rather than having a GDP growth rate of -1 percent in the second quarter of 2009, absent the stimulus of 2 percent of GDP in 2009, the United States may have had a GDP growth rate in the range of -3.1 to -5 percent.[37] This estimate that the stimulus led to a growth rate 2.1 to 4 percentage points higher in the second quarter is consistent with the analysis presented in Sections III and IV suggesting the U.S. growth rate was about 2.3 to 3.1 percentage points higher due to stimulus.

As noted, automatic stabilizers may partially mitigate the estimated relationship between stimulus and growth. If we control for the tax share of the economy in the OECD sample, we find even stronger results. The coefficient on stimulus gets even larger and the picture becomes even clearer.[38]

Observers in many countries see the link between stimulus and the beginnings of recovery. Chinese officials credit stimulus with being crucial to its GDP performance.[39] The German statistical agency reported that not only was government spending higher because of the stimulus there, but personal consumption expenditure's positive contribution to growth was largely a result of stimulus (specifically, Germany's "cash for clunkers").[40] In Japan, according

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[36] To be clear, the growth rate is annualized, meaning if one had higher stimulus of 1 percent of GDP, one would expect higher growth of 2 percentage points over the whole year, suggesting a multiplier of 2. If one-quarter of the stimulus is spent in the second quarter (so 0.25 percent of GDP) and the quarterly growth rate is higher by 0.5 percent, we again get a stimulus multiplier of 2.

[37] The forecast in November 2008 for 2009:Q2 growth for the Unite States was 0 percent. The constant in the OECD sample suggests countries would have fallen short of expectations by 3.1 percentage points if they had done no stimulus. That suggests absent stimulus the United States would have had a growth rate of -3.1 percent. Alternatively, the coefficient in the regression suggests that the 2 percent of GDP stimulus the United States did should have lifted U.S. growth by about 4 percentage points, so without a stimulus the United States would have grown at a rate of roughly -5 percent. The range across these two methods is attributable to the fact that the United States lies slightly below the regression line.

[38] See CEA report "The Effects of Fiscal Stimulus: A Cross-Country Perspective." When we control for the tax share, this helps explain the relatively small stimulus in France and Norway (and hence shifts these points to the right – towards the regression line), and shifts Mexico to the left as it had low stimulus and a low tax share. These adjustments lead to a larger, more significant coefficient.

[39] Zhuang Jian, senior economist with the Asian Development Bank, stated that government-led investment and ample credit are the main reason behind the growth in China. Also, the spokesman for the National Bureau of Statistics in China has stated that the stimulus package was the reason for improving economic performance. For example, extensive government construction has helped fixed asset investment increase 33.5 percent in the last six months, the most in five years. See Xinhua News (2009).

[40] See Statistisches Bundesamt Deutschland (2009).

to government officials, public investment has shown a steady improvement and private consumption has been supported by the effects of the policy packages.[41] And, in Korea, the statistical agency reported that in the second quarter, construction investment and government expenditure showed sustained growth, and construction investment growth was due to an increase in the public sector.[42] Stimulus has not acted alone. In both Germany and Korea, exports have been an important part of a return to growth, but stimulus has played a significant role.

The cross-country evidence relies on a small number of outcomes and the stimulus measures are for a year, and hence not the perfect measure of stimulus in the quarter. As a result, all of these estimates are subject to some revision and substantial uncertainty. But, we do see a consistent positive statistically robust relationship between stimulus and growth performance. Countries with stimulus did better than expected, and did so by a margin that is consistent with a sizable multiplier effect.

VI. THE IMPACT OF STATE FISCAL RELIEF[43]

One central feature of the ARRA is that it contains a multitude of different tax cuts and spending increases. In this section, we discuss in more detail the impact of one component that has been particularly significant in the early months of the Act: fiscal relief to the states.

State budget relief has been especially important because states, which normally must end the year with a balanced budget, experienced budget gaps of up to 20 percent of their general funds at some point during the 2009 fiscal year. In response to these gaps, states were already raising taxes and reducing spending by the time the ARRA was passed.[44] These actions not only placed further burdens on families already suffering from the recession and cut crucial services, but also directly contributed to the worsening of the downturn. The aid to states appears to have helped mitigate some of the tax increases and cuts to government social programs and services that otherwise would have taken place.

Another reason that state fiscal relief has been important is that funds can be disbursed quickly. As Table 2 showed, this relief comprised a large majority of the stimulus in the first six weeks of the ARRA. And, through the end of August, $38.4 billion of fiscal relief has been provided to the states. This represents almost half of outlays and one-quarter of total ARRA stimulus (that is, outlays plus tax reductions).

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[41] See Cabinet Office, Government of Japanese (2009).
[42] See Bank of Korea (2009).
[43] Many of the results in this section are developed in greater detail in the CEA report "The Effects of State Fiscal Relief."
[44] National Conference of State Legislatures (2009).

The two main forms the relief has taken are an adjustment in the Federal Medicaid matching rate (FMAP) and an increase in formula grants to state governments for education through the State Fiscal Stabilization Fund.[45] Of the $38.4 billion provided through the end of August, $28.1 billion came through the higher Federal share of Medicaid spending, and the remainder through increased education grants.

All states have received substantial support. The ARRA was designed to provide greater support for states hit harder by the recession. For example, it further increased the Federal component of Medicaid spending in states that have experienced especially large increases in unemployment. Moreover, because Medicaid is a means-tested program, an increase in Medicaid funding naturally provides more funds to states where more workers are unemployed.[46] And indeed, fiscal relief per capita has on average been greater in states that had higher unemployment rates at the time the Act was passed.

Since there is ample evidence that increases in government spending and reductions in taxes help slow economic downturns, there is every reason to think that the state fiscal relief has been one force helping to move the economy from recession to recovery. However, we have little direct evidence that specifically concerns the economic effects of state fiscal relief. For example, there has been little research concerning the macroeconomic effects of the 1972 State and Local Fiscal Assistance Act or the $20 billion state fiscal relief package in 2003. In this section, we therefore look at the effects of state fiscal relief in more detail.

To investigate the effects of state fiscal relief, we clearly cannot simply ask whether states that have received more ARRA funds have generally performed better: as we described, the ARRA was designed so that states that were "sicker" on average received more "medicine." To get evidence about the effects of the fiscal relief, we therefore focus on a particular part of the relief: the increase in Federal Medicaid spending which resulted from typical state Medicaid expenditures *before* the recession. Even in normal times, Medicaid expenditures per capita vary substantially across states. In addition to the increases tied to states' economic circumstances, the ARRA increased by 6.2 percentage points the Federal share of states' Medicaid expenses. As a result, states that spent more on Medicaid per resident before the recession received more recovery dollars per capita from this portion of the package.

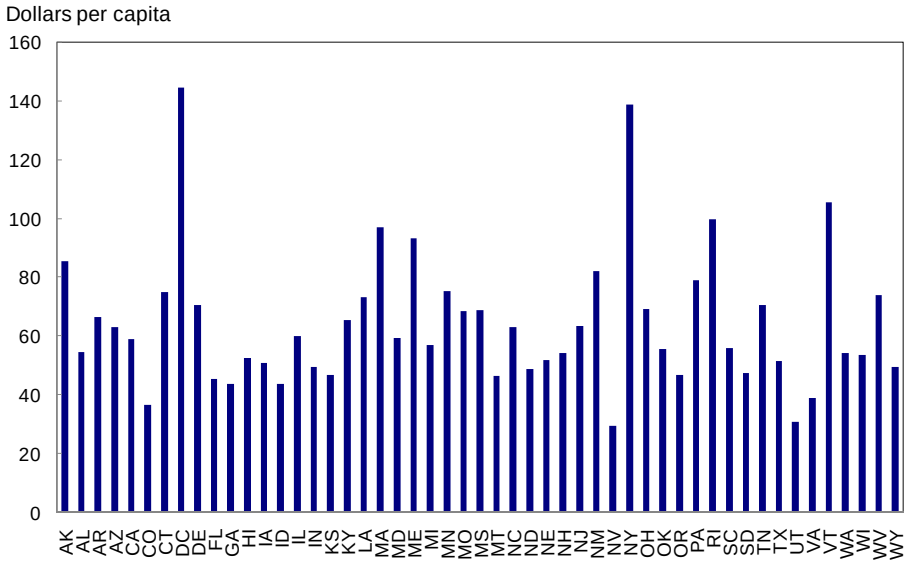
We can estimate the fiscal relief to states from this portion of the program by multiplying

[45] Indeed, as discussed in Section II, we include only these two categories of ARRA outlays in computing state fiscal relief. Spending on specific projects and support for individuals hurt by the recession that are paid for via the states are classified as government investment and aid to those directly impacted by the recession, respectively.

[46] A possible effect operating in the opposite direction is that states with larger economic declines might decrease Medicaid generosity to balance their budgets. To ensure that this did not occur, the ARRA specifically mandated that eligibility standards not be tightened, so distressed states could not alter their eligibility rules and still receive ARRA funding.

0.062 times Medicaid spending per person in the state in 2007. Since this component, which we refer to as "estimated non-cyclical ARRA Medicaid payouts," was determined before the recession, it is almost certainly less related to the recession's effects on jobs than overall state fiscal relief. Indeed, although we cannot be sure if other factors are responsible for the relationship between this measure and employment changes, we present evidence elsewhere that suggests that this correlation is not driven by some important underlying differences between states that received more money and states that received less.[47] Figure 14 shows the estimated non-cyclical ARRA Medicaid payouts for each state.

Figure 14. Estimated Non-cyclical ARRA Medicaid Payouts



Source: Centers for Medicare and Medicaid Services. Data Compendium. 2008.
Note: Each bar represents 0.062 multiplied by total per capita Medicaid expenditures in 2007.

We can then study the relationship between the change in state employment from January to July (the latest month for which we have employment data by state) and the estimated ARRA non-cyclical Medicaid payout. This comparison can show whether the states that received relatively large amounts of this type of fiscal relief saw smaller declines in employment.

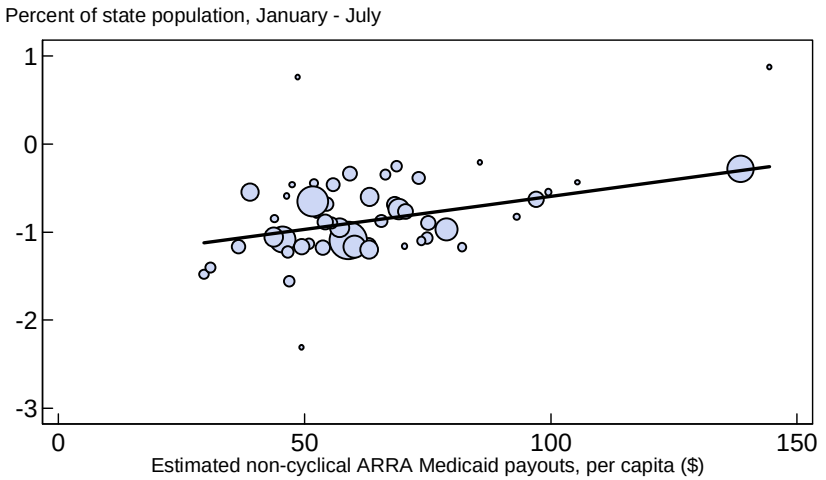
Figure 15 shows the relationship between state fiscal relief not tied to economic conditions and economic performance. The horizontal axis plots our estimated non-cyclical ARRA Medicaid payouts (per person) that a state received. The vertical axis shows the change in the percent of the state's population that was employed from January 2009 to July 2009.[48] Because the outcome variable is measured more precisely for states with larger populations, the

[47] See Council of Economic Advisers, "The Effects of State Fiscal Relief."

[48] The outcome variable is the change in the state's seasonally adjusted employment from January to July 2009, divided by its 2008 population. The data come from the Bureau of Labor Statistics (BLS) of the Department of Labor, Current Employment Statistics (CES).

best-fit line weights states by their population. However, the weighting affects the results little. The size of the circle represents the size of a state's population.[49]

Figure 15. Change in Nonfarm Employment



Sources: Centers for Medicare and Medicaid Services. Data Compendium; Bureau of Labor Statistics; CEA calculations.

Note: Size of circle proportional to 2008 state population.
The regression line is (change in employment) = -1.3 + 0.0076 * (estimated payouts).
The coefficient on estimated payouts is significant at the 99% confidence level.
The R-squared is 0.29.

The clear message from the figure is that states that received more of this type of relief experienced better labor market outcomes than states that received less. The magnitude of this relationship is large: the figure implies that receiving $120 per capita instead of $60 per capita is related to a state the size of Michigan gaining about 45,600 jobs relative to what otherwise would have occurred.[50] Although our use of Medicaid payouts based upon past Medicaid expenditures reduces the concern that correlation does not imply causation, we caution that interpreting this evidence as indicating causality remains problematic. Nonetheless, the picture changes little if we control for variables like region or industry composition.[51]

For fiscal relief to affect economic outcomes, it has to affect state budgetary decisions. One concern with fiscal relief is that states might not spend it but instead use it to bolster their

[49] Without weights, the coefficient on estimated payouts is 0.0106 and is significant at the 99 percent confidence level. We have also obtained a direct measure of the standard error of the state-level employment from the BLS. When we use this measure to construct weights, the results are very similar to the population-weighted results; the coefficient on estimated payouts is 0.0076 and is significant at the 99 percent level.

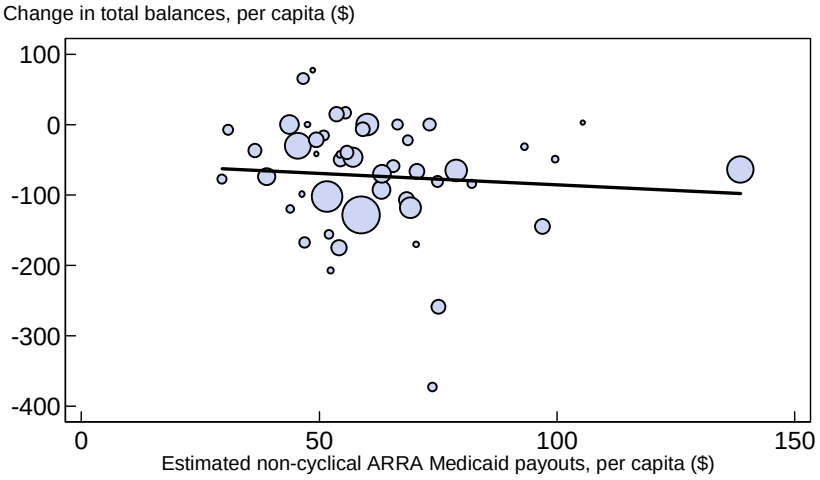
[50] We calculate this number as follows. We multiply the difference between $120 per capita and $60 per capita by the value from the regression line in the scatter plot (0.0076), divided by 100, so that employment changes are also in per capita terms. We then multiply this number by the size of Michigan's population, approximate 10 million, to arrive at 45,600. As stressed in the text, these results are correlations and should not be interpreted as a causal relationship.

[51] See CEA report "The Effects of State Fiscal Relief" for a fuller discussion. The relationship is not sensitive to moving the initial month earlier or later by a month or moving the final month earlier by a month. Furthermore, there is no significant relationship between estimated ARRA Medicaid payments and employment during pre-ARRA periods such as June to December 2008.

"rainy day" funds. Available evidence indicates that this did not occur. By June 2009, 42 states had cut their planned fiscal 2009 budgets by $31.6 billion total.[52] If states increased their rainy day funds, it would mean that they were cutting programs while increasing savings in the same fiscal year, which seems unlikely.

We can also examine directly the relationship between ARRA Medicaid transfers and relative increases in states' total balances, a comprehensive measure of state savings which contains both the rainy day fund and the state's ending balance. Figure 16 plots the estimated non-cyclical ARRA Medicaid payouts against changes in states' total balances, in per capita terms.[53] The best-fit line is slightly downward sloping, the opposite of what one would expect if larger transfers resulted in total balances build-up.

Figure 16. Total Budget Reserve Balances



Sources: Centers for Medicare and Medicaid Services. Data Compendium; National Governors Association and National Association of State Budget Officers; CEA calculations.

Note: Excludes Alaska. Total balances include balances at the end of the fiscal year and balances in budget stabilization funds. Size of circle proportional to 2008 state population. The regression line is (change in balances) = -53.1 - 0.3 * (estimated payouts). The coefficient on estimated payouts is not significant. The R-squared is 0.01.

Many state governors have described how they have used the fiscal aid to avoid expenditure reductions. For example, Governor Jan Brewer of Arizona noted her commitment to use "Arizona's portion of federal funds to help avoid massive cuts to [its] higher education system."[54] Governor Martin O'Malley of Maryland told of "looking down the barrel of those

[52] Budget cut data are from National Governors Association and National Association of State Budget Officers (2009).

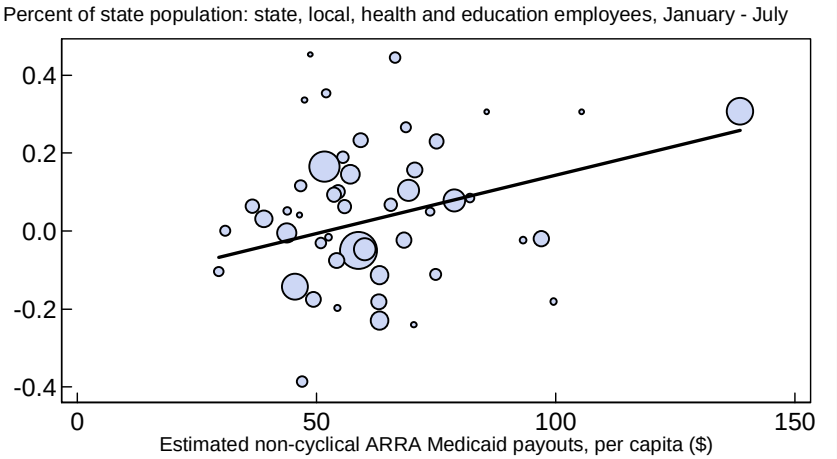
[53] For this analysis, we exclude Alaska because the change in its total balances was more than ten times larger than any other state on a per capita basis. When we include Alaska, we have a similar negative correlation. Data for a state's rainy day funds are taken from National Governors Association and National Association of State Budget Officers (2009).

[54] Brewer (2009).

hard budget decisions" and being "forced to articulate a budget that proposed devastating cuts" until the ARRA passed and allowed the state to "maintain [its] programmatic funding levels."[55] Governor Deval Patrick of Massachusetts described how the fiscal relief would help "Massachusetts sustain critical safety net programs and services while avoiding laying off thousands of teachers, public safety workers, human service providers and other government employees."[56]

Employment data confirm this narrative evidence. As states reduced budget cuts, we would expect to see fewer layoffs in the areas of public safety, education, health care and other sectors where state governments provide a large amount of financial support. Figure 17 shows the relationship between the estimated amount of fiscal relief and the change in the percent of the population employed in state and local government, education, and health care.[57]

Figure 17. Change in Government Employment



Sources: Centers for Medicare and Medicaid Services. Data Compendium; Bureau of Labor Statistics; CEA calculations.

Note: Excludes Louisiana and Wyoming due to data availability. Size of circle proportional to 2008 state population.
The regression line is (change in employment) = -0.2 + 0.003 * (estimated payouts).
The coefficient on estimated payouts is significant at the 99% confidence level.
The R-squared is 0.20.

The figure shows that states that received more dollars in fiscal transfers added or saved more jobs in these sectors. Comparing Figure 17 to Figure 15, about one-quarter to one-half of the relationship between estimated non-cyclical ARRA Medicaid payouts and total employment results from jobs created or saved in government-related sectors.

Of course, this analysis is not a definitive examination of the effects of state fiscal relief. For example, it is based on only six months of data. As more data become available and the existing data are revised, the jobs picture may become clearer. And, importantly, looking at

[55] O'Malley (2009).
[56] Patrick (2009).
[57] There is a similar correlation if we restrict attention to government employees only.

state-level outcomes gives only a partial picture of the economic benefits of state fiscal relief. Because there are spillovers across states, important parts of the effects of relief to one state will be felt in other states. Our analysis does not incorporate these spillover effects.

Despite these caveats, this preliminary analysis adds to the general evidence that fiscal stimulus improves short-term economic outcomes, and provides some direct evidence that stimulus remains effective when it takes the form of fiscal aid to the states.

VII. CONCLUSION

This report provides an initial assessment of the economic impact of the American Recovery and Reinvestment Act of 2009. Because we are still in the early stages of the Act, it must be reiterated that all of are findings are preliminary and subject to substantial uncertainty. Later reports will be able to examine a longer and richer set of economic indicators, including the estimates of jobs retained or created reported by ARRA recipients, and will surely lead to new findings and refinements to our analysis.

Because of this inherent uncertainty, we have approached the task of evaluating the impact of the ARRA from a wide range of perspectives. Importantly, the different approaches yield remarkably consistent findings. Both time-series econometric analysis and standard economic model-based analysis indicate that the Recovery Act has helped to change the trajectory of the economy. The estimates suggest that the ARRA will likely add about 3 percentage points to real GDP growth in the third quarter and will have raised employment by roughly 1 million relative to what would have happened without stimulus.

Further evidence on the impact of fiscal stimulus is provided by examining the experience of a number of countries. Countries throughout the world have responded to the crisis by enacting stimulus packages. However, they have differed substantially in the size of those packages. Our analysis suggests that countries with larger fiscal stimulus measures have experienced better outcomes relative to expectations than those with smaller packages. And, the estimated sensitivity is consistent with other estimates of the impact of the ARRA in the United States.

Because fiscal relief to the states has been a key component of the early months of the stimulus, we look in more detail at how states have responded. We find no evidence of the Recovery Act funds being squirreled away in state rainy day funds. Instead, as governors throughout the country have emphasized, the money has gone into maintaining state and local employment and hence crucial state services. We find that state fiscal relief has helped raise state employment relative to what it otherwise would have been.

In this context, it is useful to mention the Car Allowance Rebate System (CARS), the program commonly referred to as "Cash for Clunkers." Though not part of the original ARRA, the popular CARS program was funded largely with ARRA funds that were reallocated by supplemental legislation. As described in a separate report, the CEA has conducted an analysis of the evidence to date on the effects of the program.[58] The surge in automobile sales in July and August was one of the largest two-month increases in history. Our estimates suggest that the program likely added between 0.1and 0.4 percentage points to real GDP growth in the third quarter of 2009. It is likely increasing employment relative to the baseline by roughly 40,000 to 120,000 in the second half of 2009.

While important in its own right, the CARS program also has much in common with a range of initiatives in the ARRA. The First-Time Homebuyer Tax Credit, the business investment incentives, and the weatherization subsidies are all programs designed to move demand from the future, when it is likely to be less crucial, to today, when it is clearly vital to generating recovery. That the CARS program has had beneficial effects is suggestive that these elements of the ARRA will as well.

In the quarters to come, the Council of Economic Advisers will continue to investigate the impact of the individual components and the overall effectiveness of the American Recovery and Reinvestment Act of 2009. In this way, we hope to provide Congress and the American people with the accountability they expect and deserve, and future policymakers with information about the impact of this bold action to rescue the American economy.

[58] CEA Report, "Economic Analysis of the Car Allowance Rebate System."

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